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THE TERRESTRIAL MOLLUSCA INHABITING THE SOCIETY ISLANDS.

By ANDREW GARRETT.

The Society Islands, which are the largest and most important group in southeastern Polynesia, comprise eight islands of volcanic origin and two of coral formation. Seven only, *i. e.*, Tahiti, Moorea, Huaheine, Raiatea, Tahaa, Borabora and Maupiti, have each one or more species peculiar to it or not found elsewhere.

Tahiti, the largest island in the group, is about thirty-eight miles long and twenty-three wide. It may be described as two islands of very unequal size connected by a low narrow isthmus. Moorea, which is eight miles west of Tahiti, is about nine miles long and six wide. Huaheine is seventy-two miles W. N. W. of Moorea and is about the same size as the latter island. Raiatea is twenty miles west of Huaheine and is about fourteen miles long and seven wide. Tahaa, which is about the same size as Huaheine, is two miles north of Raiatea and inclosed in the same encircling reef with the latter island. Borabora is about half the size of Huaheine and situated nine miles northwest of Tahaa. Maupiti, which is smaller than Borabora, is about twenty-three miles west of that island.

The earliest recorded Society Island land shells are *Limax faba* (= *Partula faba*), Martyn, and *Bulimus Otaheitanus* (= *Partula Otaheitana*), Bruguiere, which were published nearly a century ago. These two species were discovered when the islands were visited by Capt. Cook in his second or third voyage. From that early period up to 1819, when Ferussac recorded *Helix trochiformis* in his "Prodrome," no species, so far as I can learn, were published. In 1825, Dr. Gray added *Helicina Maugeriæ* to the list. In 1830, M. Lesson (Voy. Coquille) described *Auricula viola*, *Partula lutea*, *Helicina miniata* and *Partula lineata*, all Borabora shells, except the last, which inhabits Moorea, but was erroneously assigned to one of the Caroline Islands. In 1832, MM. Quoy and Gaimard (Voy. de l'Astrolabe) described an elongate dextral variety of *Partula Otaheitana* under the name of *Helix Vanicorensis*, and wrongly accredited it to Vanicoro in Melanesia.

The islands were next partially explored by that prince of collectors, Mr. H. Cuming, who discovered many new species which were described by Broderip, Reeve and Pfeiffer. But, unfortunately, he was so very careless in regard to the precise habitats of his shells that about two-thirds of the localities recorded on *his* authority

are erroneous, and have, in consequence been a fruitful factor in the introduction of synonymous species. Several years after Cuming's visit, the naturalists of the United States Exploring Expedition, commanded by Capt. Wilkes, collected a number of new species, all of small size, which were described by Dr. Gould in the "Proceedings of the Boston Society of Natural History," and subsequently more elaborately described and figured in the official work, "Mollusca and Shells." In 1854, MM. Hombron and Jacquinot (Voy. Pol Sud), described two new species and added a synonym to Gould's *Helix Cressida*, two to Pfeiffer's *Helix coarctata*, and one to Gould's *Helix bursatella*. In 1867, Johann Zelebor, one of the naturalists of the "Novara" expedition round the world in 1857 to 1859, described *Pupa hyalina* (= *Vertigo pediculus*), *Pupa Dunkeri* (= *Vertigo tantilla*), and *Hydrocena Scherzeri*, all found on Tahiti; the last probably equals one of the extreme forms of the variable *Omphalotropis scitula*.

During the years 1860 to 1863, I made a much more thorough exploration than any of my predecessors, and, by searching in nearly every valley in the group, discovered over 50 new species. Most of these were described by the late Mr. W. H. Pease in the "Proceedings of the Zoological Society," and in the "American Journal of Conchology." The other species with his MS. names have been freely distributed, and the majority recorded in catalogues. All of these are for the first time described in the following pages. Since my residence in the group, from 1870 up to the present time, I have continued my researches, and added 19 new species to the list, one of which, *Partula acuticosta*, Mousson, MS., is recorded in "Museum Godeffroy Catal., v," and one, *Partula Mooreana*, Hartman, is described in the "Proceedings of the Academy of Natural Sciences of Philadelphia."

Genus MICROCYSTIS, Beck.

I restrict this genus to a group of small Helices, which are characterized by their orbicular, more or less depressed form, rounded, angulate or subangulate periphery, and smooth, shining surface. The umbilicus, though usually closed, is occasionally minutely perforated. The peristome is straight and sharp, with remote margins. The columella is simple, or callous, and frequently armed with a nodule or slightly twisted plait. In color they vary from whitish corneous, through all the intermediate tints, to fulvous; rarely ornamented with bands and spots. One species only exhibits a sculptured surface.

They are widely diffused throughout Polynesia, ranging from the lowlands near the seashore to several thousand feet above sea-level. A majority of the species are strictly terrestrial, and delight in moist stations, hiding beneath decaying leaves, under rotten wood and among loose stones. Others are entirely arboreal, on the foliage of shrubs and ferns. A number of the species are gregarious.

M. VERTICILLATA, Pease. Plate II, figs. 31, 31 *a*, 31 *b*.

Nanina verticillata, Pease, Amer. Jour. Conch., 1867, p. 228.
Helix verticillata, Pfeiffer, Mon. Hel., vii, p. 66.
Helicopsis verticillata, Pease, Proc. Zool. Soc., 1871, p. 475.
Nanina cicercula, var. "Mousson," Schmeltz, Cat. Mus. Godeff., v, p. 91.
Helix brunnea, Carpenter (Anton?), Proc. Zool. Soc., 1864, p. 675.

I found this species very abundant beneath moist rotten wood and amongst decaying leaves, on the north part of Moorea, and more rarely at Huaheine.

It is about the size and shape of *M. cicercula*, Gould, a Sandwich Island species, but differs in having a rounded periphery and more convex whorls. The Huaheine shells are a little larger and darker colored than Moorea specimens. The former have the inner edge of the columella simply thickened with callus, and in the latter the callus is frequently developed into a slight tubercle or somewhat twisted plait. My largest examples are 7 mill. in diameter.

M. SIMILLIMA, Pease. Plate II, figs. 32, 32 *a*, 32 *b*.

Helix simillima, Pease, Proc. Zool. Soc., 1864, p. 669. Pfeiffer, Mon. Hel., v, p. 56.
Helicopsis simillima, Pease, Proc. Zool. Soc., 1871, p. 475.
Nanina simillima, Schmeltz, Cat. Mus. Godeff., v, p. 207.

A somewhat rare species, peculiar to Raiatea, where it occurs high up in the mountain ravines, and is found beneath moist decaying leaves and under rotten wood.

Mr. Pease, who received his type specimens from me, correctly labeled as regards locality, gave the vague habitat "Central Pacific," and subsequently "Tahiti," where it does not occur. His brief diagnosis is not very satisfactory. I add the following description:—

Shell orbicular, depressed, thin, smooth, shining, pellucid, faintly striated, yellowish corneous; spire slightly elevated, convex, apex obtuse; suture faintly impressed, narrowly margined; whorls $3\frac{1}{2}$–4, flatly convex, regularly and rather rapidly increasing, the last one not descending in front, depressed; periphery rounded; base flatly convex and deeply indented at the axis; aperture ovately lunate, nearly vertical; peristome thin, straight, regularly curved, with remote margins and simple columella.

Major diam. 10, height $4\frac{1}{2}$ mill.

Its large size, depressed form, and rather rapidly increasing whorls, will readily distinguish it from any other South Polynesian species.

M. NORMALIS, Pease. Plate II, figs. 33, 33 *a*, 33 *b*.

Helix normalis, Pease, Proc. Zool. Soc., 1864, p. 669. Pfeiffer, Mon. Hel., v, p. 59.
Helicopsis normalis, Pease, Proc. Zool. Soc., 1871, p. 475.
Nanina normalis, Schmeltz, Cat. Mus. Godeff., v, p. 91.

Very abundant beneath rotten wood at Tahiti, Moorea and Huaheine. I add the following characters omitted by Mr. Pease in his short description:—

It varies in the height of the spire, the apex is obtuse, and the suture is margined

by the fine periphery-keel. The beautiful oblique striæ are confined to the upper surface, the lower being smooth and more glossy. The axis is more or less distinctly punctate. The slightly oblique aperture is angulate-lunate.

The crowded, regular, raised striæ and delicate filiform keel will at once distinguish it.

M. Discordiæ, Garrett. Plate II, figs. 35, 35 *a*, 35 *b*.

Microcystis Discordiæ, Garrett, Jour. Phil. Acad. Nat. Sci., 1881, p. 383.
Nanina subtilis, Schmeltz (not of Anton), Cat. Mus. Godeff., v, p. 91.

Abundant under damp rotten wood, and ranges throughout the group. It is equally as common at the Cook's or Harvey Islands. A few specimens were taken by me at the Marquesas group.

A small, fragile species, about the size of *normalis*, with a more or less distinctly angulate body-whorl, smooth upper surface and lighter colored than the latter.

M. cultrata, Gould.

Helix cultrata, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 172; Expl. Ex. Shells, p. 46, fig. 59. Pfeiffer, Mon. Hel., i, p. 37; (*Erepta*) Vers., p. 128.
Sagda cultrata (*Gastrodon*), H. and A. Adams, Gen. Moll., ii, p. 113.
Nanina cultrata, Gray, Cat. Pulm., p. 130. (*Microcystis*) Albers, Hel., p. 49. Bland & Binney, Amer. Jour. Conch., 1871, p. 189 (dentition).
Helicopsis cultrata, Pease, Proc. Zool. Soc., 1871, p. 475.

In 1862, I found examples of this species amongst decaying vegetation in Tahiti, but cannot state the precise locality.

It is a depressed, orbicular, very shining species, 6 mill. in diameter, with five whorls, the last one carinated and the columella dentated.

M. angustivoluta, Garrett. Plate II, figs. 34, 34 *a*, 34 *b*.

Shell small, orbicular, depressed, imperforate, thin, smooth, shining, pale amber-color, with or without small, irregular opaque-white spots; spire convex, apex depressed; suture faintly impressed, narrowly margined; whorls $5\frac{1}{2}$–6, subplaniform, narrow, slowly and regularly increasing, last one depressed, not descending in front, periphery subangulate; base flatly convex, deeply indented at the axis; aperture nearly vertical, very narrow, luniform, much wider than deep; peristome thin, simple, with very remote margins; columella small, very oblique.

Major diam. $4\frac{1}{2}$, lesser diam. 4, height $2\frac{1}{2}$ mill.

Hab.—Moorea Island.

A few examples were found under damp rotten wood on the northeast part of the island.

Its most obvious characters are its depressed form, numerous, narrow whorls, subangulate periphery, narrow aperture and indented base.

M. SCALPTA, Garrett. Plate II, figs. 30, 30 *a*, 30 *b*.

Shell imperforate, orbicular, depressed, thin, smooth, subpellucid, very glossy; fulvous, minutely dotted and irregularly lineated with whitish radiating lines; spire convex, moderately elevated; suture rather faintly impressed; whorls five, flatly convex, moderately increasing, last one rounded, not deflected in front; base convex, indented at the axis; aperture nearly vertical, orbicular-lunate; peristome straight, thin, regularly curved, margins remote; columellar region thickened with callus.

Major diam. 10, height 6 mill.

Hab.—Tahaa Island.

This fine species occurs plentifully in a small area in Haamene valley on the east of Tahaa. They were gregarious beneath stones, rotten wood, and under heaps of decaying leaves. Not a single example taken in any other part of the island or group.

It is the same size as *simillima*, but may be distinguished by its more solid texture, darker color, more elevated spire, deeper body-whorl, more rounded aperture, and the whorls are flatter and more tightly coiled. The peculiar pale markings which suggested the specific name appear very much like scratches on the surface of the shell.

Genus TROCHONANINA, Mousson.

In 1869, Prof. Mousson established the genus or subgenus *Trochonanina* (Jour. de Conch., p. 329), for the reception of the Polynesian trochiform or conical Naninæ, the type of which is *N. Schmeltziana*. Mr. Pease injudiciously classed it with *Trochomorpha*, and *Helix conula*, Pse., which is precisely the same type he places in the genus *Helicopsis* = *Microcystis*.

I fully share Mousson's views in regard to the propriety of eliminating this group from the typical *Microcystis*. They differ from the latter genus in the more or less elevated-conical or trochiform shape, angulated or filocarinate periphery, closed or perforated base, and subrhomboidal luniform aperture. Like the preceding genus, the columella is either simple, nodulous or spirally plaited. The base is always smooth and shining; the superior surface is rougher, the striæ more decided and regular, sometimes rib-like, and frequently with fine spiral raised lines.

They possess the habits of *Microcystis*, and, except the Sandwich Islands, where they appear to be absent, have nearly the same distribution.

T. CONULA, Pease. Plate II, figs. 36, 36 *a*, 36 *b*.

Helix conula, Pease, Proc. Zool. Soc., 1861, p. 243. Pfeiffer, Mon. Hel., v, p. 62.

Helicopsis conula, Pease, Proc. Zool. Soc., 1871, p. 475.

Nanina Tongana, Schmeltz (not of Quoy and Gaimard), Cat. Mus. Godeff., v, p. 91 ("see Mousson").

Microcystis conula, Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 383.

Rather plentiful on the foliage of low bushes and common to all the islands. It occurs, also, at Rarotonga, one of the Cook's or Harvey Islands.

Its trochiform shape, acutely angular body, and conspicuous peculiar columellar plait, will determine it.

T. OBCONICA, Pease. Plate II, figs. 37, 37 *a*, 37 *b*.

Helix obconica, Pease, Proc. Zool. Soc., 1864, p. 669. Pfeiffer, Mon. Hel., v, p. 85.
Trochomorpha obconica, Pease, Proc. Zool. Soc., 1871, p. 475.
Nanina obconica, Schmeltz, Cat. Mus. Godeff., v, p. 207.

This species is peculiar to Raiatea, where it is very local and somewhat rare. It occurs in the higher portions of two valleys, one on the east and the other on the west side of the island.

Its most essential characters are its depressed-trochoid form, acute carination, small but pervious umbilicus, and fine crowded striæ. My largest example is 8 mill. in diameter.

T. CALCULOSA, Gould.

Helix calculosa, Gould, Expl. Ex. Shells, p. 48, Pl. V, fig. 63. Pfeiffer, Mon. Hel., iii, p. 41.
Zonites (*Conulus*) *calculosus*, H. and A. Adams, Gen. Moll., ii, p. 116.
Nanina calculosa, Gray, Cat. Pulm., p. 126. Schmeltz, Cat. Mus. Godeff., v, p. 91.
Nanina (*Trochomorpha*) *calculosa*, Albers, Hel., p. 60.

Not uncommon on foliage and is diffused throughout the group, ranging from the lowlands near the seashore to about 1000 feet above sea-level. I also obtained many examples on Dominique, one of the Marquesas Islands, and a few at Malolo, one of the Viti group. Its existence in the latter location is the more remarkable as it has not been observed on any of the intermediate islands.

My largest examples, which are $4\frac{1}{2}$ mill. in diam., and a trifle less in height, are larger than Gould's specimens. It may readily be distinguished by its globose-pyramidal form, angulate body-whorl and oblique aperture. The umbilicus, though generally closed, is sometimes punctiform, and the columella reflexed.

It is not included in Mr. Pease's List of Polynesian Land Shells.

T. SUBRUGOSA, Garrett. Plate II, figs. 38, 38 *a*, 38 *b*, 38 *c*, 38 *d*.

Shell small, imperforate, globose-conic, thin, subpellucid, fulvous; upper surface with crowded, slightly oblique, plicate striæ; spire depressed-conic, apex planulate; suture linearly impressed; base convex, smooth, glossy, indented at the axis; whorls 4–$4\frac{1}{2}$, strongly convex, slowly and regularly increasing, last one narrow, rounded, not descending in front, periphery with a thread-like keel; aperture slightly oblique, transversely ovate-luniform; peristome thin, simple, regularly curved, with remote margins; columella slightly thickened with callus.

Major diam. $2\frac{1}{2}$, height 2 mill.

Hab.—Tahiti and Moorea.

This small sculptured species is somewhat rare. It was found under stones on the northwest side of Tahiti, at an elevation of about 1000 feet. A few examples were

taken in a large valley on the north side of Moorea, but at a much less elevation above sea-level.

Its most important characters are its globose-conic form, rib-like striæ, dark color, smooth base and delicate periphery-keel. It cannot be confounded with any other Polynesian species.

T. Tahitensis, Garrett. Plate II, figs. 39, 39 *a*, 39 *b*, 39 *c*.

Shell small, subperforated, depressed-turbinate, thin, subpellucid, above with fine, sharp, crowded, oblique, elevated striæ, fulvous corneous; spire dome-shaped, smooth and rounded at the apex; suture moderately impressed, margined above by the continuation of the periphery-keel; base depressly convex, smooth, glossy, perforation punctiform, not deep; whorls four and a half, flatly convex, regularly increasing, last one narrow, not deflected in front, periphery with a prominent thread-like keel; aperture slightly oblique, ovate-lunate; peristome straight, acute, with distant margins; columella with a large, white, tubercular nodule.

Major diam. $2\frac{1}{2}$, height 2 mill.

Hab.—Tahiti.

This, the smallest species inhabiting the group, was found adhering to the under side of loose stones at an altitude of 2000 feet, on the northwest side of Tahiti.

It is nearly the shape of *subrugosa*, but is more rare, smaller, whorls flatter, spire more regularly dome-shaped, striæ much finer, and the conspicuous columellar nodule will at once distinguish it.

Genus ZONITES, Montfort.

Z. Mooreana, Garrett. Plate II, figs. 28, 28 *a*, 28 *b*.

Shell small, perforated, orbicular, depressed, thin, pellucid, shining, faintly striated, whitish corneous; spire convexly elevated; suture faintly impressed, narrowly margined; whorls four, slightly convex, regularly and moderately increasing, last one somewhat depressed, not descending in front, rounded on the periphery; base depressly convex, deeply indented at the axis, which exhibits a small perforation; aperture subvertical, orbicular-luniform; peristome acute, straight, roundly curved, margins distant; columella simple.

Major diam. 4, height $2\frac{1}{2}$ mill.

Of this small species I have five examples before me, all found associated with *M. verticillata* at Moorea.

It can scarcely be distinguished from *Z. Vitiensis*, except in being smaller, more polished, paler and the striæ smoother.

Genus TROCHOMORPHA, Albers.

So far as I can ascertain, the Society Islands are the only group in Eastern Polynesia inhabited by the above genus. Dr. Pfeiffer, on the authority of Anton, cites Opara = Rapa as one of the localities of *T. trochiformis*. If the genus occurs on that

small island, which I very much doubt, the species is distinct from the Society Island shells. Mr. Gloyne, in his very valuable paper on the "Geographical Distribution of Terrestrial Mollusca" (Quar. Jour. Conch., i, p. 315), erroneously assigns three species of *Trochomorpha* to the Cook's Islands, where the genus does not occur. He is also wrong in referring the genera *Palaina*, *Cyclomorpha* and *Cyclophorus* to that group.

In the Society Islands all the Trochomorphæ are peculiar to the group, and occur on all the islands except Borabora and Maupiti. Having personally collected several thousand specimens at the five islands inhabited by the genus, and after a thorough study and critical comparison with numerous species from the various islands in the Western Pacific, I do not hesitate to assign five species to the group. One restricted to Tahiti, one to Huaheine, two common to Raiatea and Tahaa, and one common to Tahiti and Moorea.

T. TROCHIFORMIS, Ferussac.

Helix trochiformis (*Hellicella*), Ferussac, Prod., p. 301. Pfeiffer, Symb., ii, p. 40; Mon. Hel., i, p. 206. Chemnitz, ed. 2d, No. 68, p. 13, figs. 7, 8. Gould, Expl. Ex. Shells, p. 61 (part). Reeve, Conch. Icon., No. 606, Pl. CVIII, fig. 606.

Trochomorpha trochiformis, Albers, Die Hel., p. 116. Pfeiffer, Vers., p. 133. Pease, Jour. de Conch., 1871, p. 398; Proc. Zool. Soc., 1871, pp. 456, 474.

Zonites trochiformis (*Trochomorpha*), H. and A. Adams, Gen. Moll., ii, p. 115.

Nanina trochiformis (*Trochomorpha*), Albers, Die Hel., ed. 2d, p. 60. (*Discus*) Paetel, Cat. Conch., p. 85.

This very variable species lives on the trunks of trees and is restricted to Raiatea and Tahaa. Dr. Pfeiffer, on the authority of Anton, erroneously cites Tahiti and Opara = Rapa as its habitat. It is scarcely necessary to add that Ferussac's locality, "Isle de France," is also erroneous.

It is subject to more variation than any other known species. The usual proportion of height to the greatest diameter is 10 by 16, and the extreme variation 12 by 14 and 9 by 14 mill. The umbilicus is deep and narrow. Whorls six, convex, conspicuously margined, last one with a compressed periphery-keel. Base rather strongly convex, and Pfeiffer's "margine columellari recte descendente" is a well-marked feature in separating it from the nearest allied species. The color is yellowish brown, honey-yellow, more rarely orange-yellow, with a dorsal and basal deep brown-black, generally sharply defined band. The dorsal band which occupies the lower half of the whorls is narrower than the basal one, which latter is submarginal. The acute periphery-keel is pale straw-yellow. Occasionally the bands are diffused over the whole width of the whorls, except the keel and sutural margination. A more rare variety occurs of a pale greenish yellow, with the bands nearly or quite obsolete. Uniform honey-yellow specimens are also very rare.

Hybrids between this species and *Swainsonii* are not infrequent, and are more depressed, the umbilicus more open and the columella more obliquely curved than in the normal condition. Mr. Pease may have mistaken these hybrids for Gould's *Cressida*.

T. PALLENS, Pease. Plate III, fig. 43.

Helix trochiformis, Gould (not of Fer.), Expl. Ex. Shells, p. 61 (part).

Helix Cressida, Schmeltz (not of Gould), Cat. Mus. Godeff., v, p. 95.

Trochomorpha trochiformis, var. *pallens*, Pease, Jour. de Conch., 1870, p. 399; Proc. Zool. Soc., 1871, pp. 457, 474.

Common, but very local on the trunks of trees at Tahiti and Moorea. It has usually been confounded with *trochiformis*, and was described by Mr. Pease as var. *pallens*. After a critical comparison of a large number of specimens from the above-mentioned localities with the Raiatea shells, I have separated it as a distinct, though closely allied, species.

Shell umbilicated, rather solid, subtrochiform, obliquely and roughly striated, scarcely shining, yellowish white, with two narrow, revolving, reddish chestnut bands, the basal one the larger, and both submedian; spire depressly conoid, with nearly planulate outlines and rounded apex; suture with a narrow, depressed margin; whorls six, slightly convex, slowly and regularly increasing, last one not deflected in front, acutely and compressly keeled, keel whitish; base flatly convex, umbilicus narrow, about one-sixth the major diameter of the shell; aperture rhomboid-luniform; peristome, above the keel, acute, straight, beneath the keel, gently arched, receding; incrassated at the base.

Major diam. 16, height 9 mill.

Hab.—Tahiti and Moorea.

Var. *a*. Bands median, wide, blackish chestnut. Common.

Var. *b*. Pale honey-yellow, with narrow reddish brown bands, which are frequently marginal. Somewhat rare and local.

Var. *c*. Uniform whitish or yellowish white. Very rare.

Var. *d*. Excepting the white keel and sutural margin, blackish chestnut. Rather rare.

As compared with the preceding species, it is more depressed, the whorls flatter, the base more planulate, the striæ rougher and the columella more oblique and arched. The keel and sutural margin are white, and the aperture is more depressed.

Examples of these shells sent to three good conchologists were by one referred to *Cressida*, Gld., by another to *Apia*, H. and J., and the third referred it to *exclusa*, Fer. I sent at the same time specimens of *trochiformis*, which were correctly determined.

T. CRESSIDA, Gould.

Helix Cressida, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 176; Expl. Ex. Shells, p. 57, fig. 56. Pfeiffer, Mon. Hel., i, p. 123.

Zonites Cressida, H. and A. Adams, Gen. Moll., ii, p. 114.

Nanina Cressida (*Discus*), Albers, Die Hel., ed. 2d, p. 62.

Helix Vahine, Hombron and Jacquinot, Voy. Pol. Sud, Pl. VII, figs. 1–4.

Helix exclusa, var., Pfeiffer (not of Fer.), Mon. Hel., iv, p. 115.

Helix Swainsoni, var., Pfeiffer, Mon. Hel., iii, p. 157.

Much doubt and confusion exist in regard to Gould's *Helix Cressida*, which he

says inhabits Tahiti and Samoa; the latter location is undoubtedly wrong. Mr. Pease says (Jour. de Conch., 1870, p. 399) *Cressida* is a good species, and inhabits Raiatea. Having personally collected all Mr. Pease's Raiatea shells, and having now before me numerous duplicates, I have failed to discover one which coincides with Gould's description. Mr. Pease's *Helix lenta*, MS. (= *Swainsoni*, var.), is the nearest allied form, but is much smaller, thinner and has a more convex base.

Dr. Gould's original description is as follows:—

"T. variabilis, solida, depressa, lenticularis, acute carinata, nitida, dense et acute striata, coloribus flavo-viridibus et castaneis coalescentibus fasciata, infra subplanulata, umbilico magno et profundo perforata; anfr. 5 vix convexi; apertura triangularis; labrum acutum; faux lilacina.—Lat. $\frac{7}{10}$, alt. $\frac{1}{4}$ poll." (Gould).

The only shell I can satisfactorily refer to the above diagnosis is a somewhat scarce species inhabiting two large valleys on the northwest side of Tahiti. The localities are near the two principal harbors and probably were the first ones explored by the naturalists of Wilkes' Expedition.

I have now before me five examples, the largest measuring 18 mill. in the major diameter and 6 in height. It is a solid, shining, depressed shell, with crowded, irregular, rather sharp, obliquely curved striæ, and 5–5½ subplanulate whorls. The suture is margined by the continuation of the acute periphery-keel. The flatly convex base exhibits a wide umbilicus in which may be easily enumerated all the volutions. The color is light yellowish brown, with or without a dorsal and basal light chestnut band which gradually fades into the ground color. Occasionally the basal band is obsolete, and the dorsal one so faint as not to be seen except in certain lights. The aperture is diagonal, depressed, securiform, with three angles which suggested Gould's "apertura triangularis." The peristome, above the carination, is trenchant, rectilinear and regularly curved from the keel to the columellar region, the inner margin strengthened with callus.

T. Swainsoni, Pfeiffer.

Helix Swainsoni, Pfeiffer, Proc. Zool. Soc., 1846, p. 28; Mon. Hel., i, p. 122; (*Videna*) Vers., p. 132. Reeve, Conch. Icon., fig. 607. Carpenter, Proc. Zool. Soc., 1864, p. 675. Schmeltz, Cat. Mus. Godeff., v, p. 95.

Zonites Swainsoni (*Rotula*), H. and A. Adams, Gen. Moll., ii, p. 116.

Helix scuta, Pease, MS. Coll. Pease, 1863.

Helix lenta, Pease, MS. Coll. Pease, 1863.

Nanina Swainsoni (*Rotula*), Paetel, Cat. Conch., p. 85.

Trochomorpha Swainsoni, Pease, Proc. Zool. Soc., 1871, p. 474 (part).

This species, which inhabits Raiatea and Tahaa, occurs in nearly all the large valleys, but is not nearly so plentiful as *trochiformis*. It is a ground species, and may be found lurking under rotten logs, among decaying leaves, and, during rainy weather, may be seen creeping a short distance up the trunks of trees.

Dr. Pfeiffer, on the authority of Mr. Tucker, cites "Tahiti" as its habitat. I am confident it does not occur on that island.

It is a thin, depressed, acutely carinated species, of a luteous or whitish horn-color, with a dorsal and basal brownish red line; the upper one traversing the middle of the volutions, and the lower one submarginal. The whorls are depressed or slightly convex and striated by rather rough lines of growth. The faint sutural line is narrowly margined. The convex base is considerably excavated on the boundaries of the umbilicus, which latter varies from moderate to large, conical and freely exposing all the volutions. The very oblique aperture is depressed, subsecuriform. Peristome thin and nearly straight, above the keel, beneath which it gently recedes, and presents a slight curve to the axis of the shell. They vary some in the elevation of the spire, and occasionally the lineations are obsolete. My largest examples are 16 mill. in the greatest diameter.

The animal, as seen through the thin shell, is maculated with dark slate and light gray. The exposed parts are slender and of a light gray or slate-color with a grayish buff creeping-disk. The eye-peduncles are long and slender, darker generally than the other parts. The tentacles are very small, and the foot, which equals in length the major diameter of the shell, is laterally grooved.

Pease's *Helix lenta*, which gradually merges into the typical *Swainsonii*, is brownish horn-color, with or without a submedian obscure chestnut band, and usually has the whorls more convex and the last one narrower than in the type. It is closely allied to *T. abrochroa*, Crosse, inhabiting the Viti Isles.

T. ASSIMILIS, Garrett. Plate III, fig. 44.

Shell umbilicated, rather solid, subpellucid, subtrochiform, striæ fine and oblique; greenish horn-color, with two brownish red revolving narrow bands, one above nearly median, the other on the base and intermarginal; spire variable, more or less depressly conoid, rounded above; suture with a narrow pale margin; whorls $5\frac{1}{2}$–6, the upper ones convex, the three lower subplanulate, narrow, slowly and regularly increasing, the last one acutely carinated, the carina compressed, rugose; base subplanulate, umbilicus moderate, profound, with rounded margins; aperture diagonal, depressed, securiform; peristome thin, straight, above rectilinear, beneath the keel gently arched; columella and base incrassated.

Major diam. 15, height 7 mill.

Hab.—Huaheine.

This species is restricted to the above island, where it is not infrequent on the trunks of trees.

It has hitherto been confounded with *trochiformis* and *Eurydice*, the latter a Tonga species. It is more nearly related to *pallens* than any other species; but appears to me sufficiently distinct to rank as a separate species. They are very uniform in color

and fasciation; they vary some in the elevation of the spire. The various species of this genus are so closely allied that it is difficult to express in words the specific differences.

Compared with *pallens* it is smaller, color different, the band *always* narrow, and the umbilical region more excavated. The whorls are also a little more flattened. The obliquely arched columella will at once separate it from *trochiformis*.

Genus PATULA, Held.

P. MODICELLA, Ferussac.

Helix modicella, Fer., Mus. Deshayes, in Ferussac's Hist. Moll., i, p. 90, Pl. LXXXVI. fig. 3. Pfeiffer, Mon. Hel., iii, p. 92; vii, p. 149. (*Patula*) Paetel, Cat. Conch., p. 92.

Nanina modicella, Gray, Cat. Pulm., p. 129.

Pitys modicella, Pease, Proc. Zool. Soc., 1871, p. 474.

Patula modicella, Schmeltz, Cat. Mus. Godeff., v, p. 93. Mousson, Jour. de Conch., 1873. p. 104.

Pithys Atiensis, Pease, Jour. de Conch., 1870, p. 394.

Pitys Atiensis, Pease, Proc. Zool. Soc., 1871, pp. 453, 474.

Patula Atiensis, Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 386.

Helix Atiensis, Pfeiffer, Mon. Hel., vii, p. 165.

Patula vicaria, Mousson, Jour. de Conch., 1871, p. 11, Pl. III, fig. 2; 1873, p. 104. Schmeltz. Cat. Mus. Godeff., v, p. 93.

Helix vicaria, Pfeiffer, Mon. Hel., vii, p. 187. (*Patula*) Paetel, Cat. Conch., p. 93.

This species, which is distributed throughout the group, is found adhering to the under side of dead wood in the lowland forests. It appears to be more rare in the Paumotus, and is widely diffused over the Harvey Islands. I also obtained it in the Tonga, and Dr. Graffe gathered examples in the low coral islands of the Ellice group, which gives it a wider range than any other Polynesian species.

Dr. Pfeiffer, who was unacquainted with this species, copies Deshayes' description, and, on the authority of Mr. Cuming, cites Tahiti as its habitat. He describes it as follows:—

"T. minima, orbiculato-depressa, tenuissima striata, late umbilicata, corneo-fulva; anfr. 4½ convexusculi, sutura canaliculata separati; apertura simplex, rotundato-semilunaris. Diam. 3, alt. 1½ mill." (Pfeiffer).

The above brief diagnosis accords closely with the numerous examples before me. Though occasionally uniform fulvous horn-color, and sometimes pale corneous, they are nevertheless frequently ornamented with faint reddish brown stripes and tessellations. The four and a half whorls are separated by a channeled sutural line. The spire is slightly convex or planulate. Whorls convex, last one moderately flattened above the periphery, and the striæ consist of fine, very crowded, sharp, lamelliform riblets, which are very slightly biarcuate. The perspective umbilicus is nearly a third of the major diameter of the shell.

Mr. Pease's *Pithys Atiensis*, which I add to the synonymy, is thus described:—

"T. orbicularis, tenuiscula, late umbilicata, confertim costulata, flavido et rufo tessellato-strigata; spira vix elevata, apice obtuso; anfr. 5, convexi, ultimus ad peripheriam rotundatus; sutura bene impressa; apertura obliqua, subcircularis, lamellis carens; perist. simplex, rectum. Diam. 3, alt. $1\frac{3}{4}$ mill." (Pease).

The Harvey Island shells, which attain a larger size than those found elsewhere, differ none in shape and sculpture, and the coloration is the same as Society Island specimens. The umbilicus varies from one-fourth to one-third the greater diameter of the shell.

I also add to the synonymy Mousson's *Patula vicaria*, described as follows:—

"T. parvula, aperte umbilicata, orbiculato-depressa, regulariter et tenuiter costulato-striata, striis squamulosis, faciis pallide corneis et fuscis radiatim picta. Spira planiuscula, subarcte spirata; summo minuto, lævigato, obtuso; sutura perimpressa. Anfr. $4\frac{1}{2}$, lente accrescentes, convexi; ultimus lente descendens, supra paulo tumidulus, deinde regulariter rotundatus. Apertura subverticalis (15° cum axi), exacte lunato-semicircularis, plicis destituta. Perist. rectum, acutum; marginibus convergentibus; dextro et basali antrorsum leniter biarcuatis, columellari non reflexo, nec protracto. Umbilicus $\frac{1}{4}$ diametri æquans. Alt. 1·5, diam. 3 mill. Rat. anfr. 7 : 2. Rat. apert. 1 : 1" (Mousson).

With the exception of being a trifle smaller, is not dissimilar in any respect from the Harvey Island shells.

The above author has described a variety of *modicella* from the Kermandec or Sunday Island, as follows:—

"Anfractibus magis rotundatis, costulis, sed tenuibus; albescens, maculis et flammulis rufis transverse picta; diam. 3, alt. 1·2 mill." (Mousson).

P. CONSIMILIS, Pease. Plate II, figs. 12, 12 *a*, 12 *b*.

Helix consimilis, Pease, Amer. Jour. Conch., 1867, p. 227. Pfeiffer, Mon. Hel., vii, p. 262.
Helix radiella, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675.
Pitys consimilis, Pease, Proc. Zool. Soc., 1871, p. 474.
Patula societatus, "Mousson," Schmeltz, Cat. Mus. Godeff., iv, p. 73. Paetel, Cat. Conch., p. 95. Pfeiffer, Mon. Hel., vii, p. 482.
Patula consimilis, Schmeltz, Cat. Mus. Godeff., v, p. 207.

Common and diffused throughout all the larger valleys of Raiatea, where it is peculiar. Mr. Pease's habitat, "Tahiti," is wrong. I collected all his type examples at the former island.

The spire is convex, the first and second whorls planulate and the suture channeled. The whorls are narrow, slowly and regularly increasing, turgid next to the suture and the rib-like striæ are very thin and closely set. The aperture is nearly vertical and the parietal region with one or two laminæ.

P. ACUTICOSTA, Mousson, MS. Plate II, figs. 13, 13 *a*, 13 *b*.

Patula acuticosta, "Mousson," Schmeltz, Cat. Mus. Godeff., v, p. 93.
Helix acuticosta, Pfeiffer, Mon. Hel., vii, p. 480. (Name only.)

Though less abundant, is, like *consimilis*, confined to Raiatea.

So far as I can ascertain, there has been no description published. I subjoin the following:—

Shell widely umbilicated, depressed-orbicular, corneous with reddish brown tessellations; radiately striated with thin, rather closely set, slightly arcuate, riblets; spire flatly convex, apex planulate; suture deeply impressed; whorls five, convex, slowly and regularly increasing, turgid next to the suture, last one slightly depressed above, not descending in front, base convex; umbilicus large, perspective, exhibiting all the whorls, about one-third the major diameter of the shell; aperture nearly vertical, irregularly orbicular-lunate; parietal region with one or two, very rarely three laminæ; peristome simple, straight, with remote margins.

Major diam. $4\frac{1}{3}$, height 2 mill.

A very rare variety occurs which is uniform whitish horn-color.

As compared with *consimilis* it is larger, more depressed, umbilicus larger and ribs finer.

P. LAMELLICOSTA, Garrett. Plate II, figs. 11, 11 *a*, 11 *b*.

Shell small, widely umbilicated, orbicular, depressed, thin, subpellucid, brown or fulvous-brown, unicolored or tessellated with deeper brown; radiately striated with rather distant, oblique, slightly waved lamelliform riblets; spire flat, not rising above the penultimate whorl; suture deeply impressed; whorls four, convex, slowly and regularly increasing, the last not descending in front, rounded on the periphery, obliquely depressed above; umbilicus more than a third the greater diameter of the shell; aperture oblique, orbicular-lunate.

Major diam. 3, height $1\frac{1}{2}$ mill.

Appears to be a scarce species, living beneath rotten wood in damp stations at Tahiti. It is more openly umbilicated than any other Society Island species. The proportion of the umbilicus to the major diameter of the shell is the same as *P. gradata*, Gld., and the sculpture is similar to *P. tenuicostata*, Garr.

Genus PITYS, Beck.

As stated in my paper on the "Terrestrial Mollusca inhabiting the Cook's or Harvey Islands," published in the Journal of the Academy of Natural Sciences of Philadelphia, I restrict this genus to those species characterized by the existence of laminæ on both the parietal region and palate.

P. MAUPIENSIS, Garrett.

Pitys Maupiensis, Garrett, Proc. Cal. Acad. Sciences, 1872, p. 204; Proc. Acad. Nat. Sci. Phil., 1873, p. 233, Pl. III, fig. 64.

Patula Maupitiensis, Schmeltz, Cat. Mus. Godeff., v, p. 93.

Helix Maupitiensis, Pfeiffer, Mon. Hel., vii, p. 481.

Very common, and confined to the small island of Maupiti.

It may be distinguished from any other Polynesian species by its fine, crowded, elevated (not costulate) striæ, convex spire, numerous very narrow rounded whorls, numerous internal laminæ and deep vertical umbilicus. The parietal laminæ are three, rarely two, and sometimes the one on the columellar region is obsolete. Besides the usual four palatal laminæ, there exist, sometimes, finer and shorter intermediate ones.

P. PARVIDENS, Pease. Plate II, figs. 14, 14 *a*, 14 *b*, 14 *c*.

Helix parvidens, Pease, Proc. Zool. Soc., 1861, p. 243. Pfeiffer, Mon. Hel., v, p. 220.

Pitys parvidens, Pease, Proc. Zool. Soc., 1871, p. 474.

Patula incerta, "Mousson," Schmeltz, Cat. Mus. Godeff., v, p. 93.

Helix incerta, Pfeiffer, Mon. Hel., vii, p. 481.

Very abundant and confined to Tahiti, Moorea and Huaheine. Examples from the three different localities are precisely alike as regards the character of the fine, rib-like striæ, size of the umbilicus and shape of the spire. There are generally two, rarely three, parietal laminæ, and usually four, sometimes five in the palate. Tahiti and Moorea specimens are a little larger and darker-colored than those from Huaheine, which latter have a cinereous base.

P. CONSOBRINA, Garrett. Plate II, figs. 17, 17 *a*, 17 *b*, 17 *c*.

Shell umbilicated, thin, orbicular, depressed, radiately striated with very fine, crowded, nearly straight, membraneous riblets; yellowish horn-color, tessellated and striped with reddish brown; spire planulate; suture channeled; whorls six, very narrow, convexly rounded, subangulate next to the suture, slowly and regularly increasing, the last one not deflected in front, much deeper than wide, obtusely rounded on the periphery; base convex; umbilicus perspective, showing all the whorls, nearly a third the greater diameter of the shell; aperture vertical, narrow, irregularly orbicular-lunate; parietal region with four (very rarely three), and the palate with from seven to nine laminæ; peristome thin, straight, simple with remote margins; columella with or without a lamelliform plait.

Major diam. 3, height $1\frac{1}{2}$ mill.

Hab.—Huaheine Island.

Rare and peculiar to one valley. The spire is more planulate and the body-whorl deeper than *parvidens*. It also has one more whorl, and the laminæ are much more numerous than in the latter species.

P. SUBTILIS, Garrett. Plate II, figs. 15, 15 *a*, 15 *b*, 15 *c*.

Shell umbilicated, orbicular, depressed, thin, yellowish corneous, tessellated and

zigzagged with chestnut-brown; sculpture consisting of radiating, very thin, not crowded, subbiarcuate riblets; spire slightly convex, apex flat, suture channeled; whorls five, narrow, rounded, subangulate near the suture, slowly and regularly increasing, last one rounded on the periphery; base convex; umbilicus moderate, about one-fourth the major diameter of the shell; aperture vertical, narrow, orbicular-lunate; parietal wall with two, and the palate with four (rarely three or five) laminæ; peristome thin, straight, with remote margins.

Major diam. 3, height $1\frac{1}{2}$ mill.

Hab.—Huaheine Island.

A somewhat rare species, confined to a valley on the north end of Huaheine. It differs from *parvidens* in having the riblets much further apart, deeper channeled suture and the whorls angulated next to the suture.

P. PUNCTIPERFORATA, Garrett. Plate II, figs. 16, 16 *a*, 16 *b*, 16 *c*.

Shell small, perforated, orbicular, depressed, thin, corneous, tessellated above with reddish brown, beneath corn-color, or radiately striped with the same hue; striæ very closely set, thin, rib-like, subarcuated, smaller and more crowded beneath; spire convex or convexly rounded; apex planulate; suture deeply impressed; whorls six, rounded, narrow, regularly and slowly increasing, last one not descending in front, gibbous above; base convex; umbilicus very small, punctiform; aperture vertical, narrow luniform; parietal region with two (rarely three), and the palate with from four to five laminæ, one of which is columellar; besides the laminæ there exist parallel raised lines both on the wall of the aperture and in the palate; peristome thin, simple, with remote margins; columella thickened with callus.

Major diam. 3, height $1\frac{1}{4}$ mill.

Hab.—Moorea Island.

A few examples were found at the above locality, but not obtained in any other part of the group. The minute umbilicus will at once distinguish it from any other Society Island species. One specimen is uniform pale horn-color.

P. BORABORENSIS, Garrett. Plate II, figs. 18, 18 *a*, 18 *b*.

Shell orbicular, depressed, widely umbilicated, thin, corneous under a light brownish epidermis; above tessellated, beneath with or without undulating stripes of a dark chestnut-brown; sculpture consisting of small, thin, crowded slightly waved riblets; spire but little elevated, apex flat; suture deeply impressed; whorls seven, convex, very slowly increasing, last one subangulate, base convexly rounded; umbilicus large, perspective, exhibiting all the whorls; aperture subvertical, ovate-luniform; parietal region with four and the palate with five or six laminæ, peristome simple with remote margins.

Major diam. 5, height $2\frac{1}{4}$ mill.

Hab.—Borabora Island.

This, the largest species inhabiting the group, is comparatively rare, and is peculiar to the above island, where it was found about 900 feet above sea-level.

Its most obvious characters are its large size, wide perspective umbilicus, depressed form, numerous whorls, subangulate periphery and numerous laminæ.

Genus LIBERA, Garrett.

There exists a good deal of confusion in regard to the synonymy of the Society Island species of *Libera*, caused, no doubt, by the intermixture of specimens collected in different localities. Such, I am sure, was the case with the examples collected by the naturalists of the United States Exploring Expedition, which were described by Dr. Gould under the name of *Helix bursatella* and varieties. The numerous specimens collected by the writer at Tahiti and Moorea, in 1861, passed into Mr. Pease's possession, and, like Gould (with one exception), he regarded them as a single variable species.

In my subsequent explorations of the above two islands I made a careful study of the specimens gathered in the different valleys on each island, and am thoroughly convinced that there are several valid species included in Gould's *H. bursatella* and varieties. In fact the various species are as well defined and distinct from each other as the majority of Helices, and, so far as I know, do not intergrade with each other. It is particularly noteworthy that each species has its special habitat; some restricted to a single valley, and others ranging throughout two or more valleys, but never intruding on each other's localities. The Tahiti species are specifically distinct from the Moorea shells, and both differ from those inhabiting the Cook's group. It is a noteworthy and remarkable fact that this genus, which in this group is restricted to Tahiti and Moorea, is represented in all the leeward islands by the allied genus *Endodonta*.

Dr. Pfeiffer appears to have been somewhat bewildered in his treatment of the various species described by Gould, Reeve, Hombron and Jacquinot, and himself. In the first volume of his "Monographia Heliceorum," he simply repeats Gould's description and varieties. In his third volume he restricts and redescribes Gould's species, and adds to its synonymy *H. turricula*, Homb. and Jacq., and removes Gould's var. *b*, together with *H. excavata*, Homb. and Jacq., to the synonymy of *H. Jacquinoti*, Pfr., and cites Tahiti and Marquesas as habitats. On the same page he describes *H. cavernula*, Homb. and Jacq., with *H. coarctata*, Pfr., as a synonym. In the fourth volume he eliminates *H. turricula* from the synonymy of *H. bursatella*, and removes *H. excavata* from *H. Jacquinoti* to Gould's species. He also shifts *H. cavernula*, Homb. and Jacq. (not of Pfr.), to the synonymy of *H. Jacquinoti*. His *H. cavernula* (not of Homb. and Jacq.) he refers to *H. streptaxon*, Rve., and quotes *H. coarctata*, *H. turricula* and Gould's *H. bursatella*, var. *b* and *c*, as synonyms of Reeve's shell. In the fifth volume he doubts *H. cavernula*, H. and J., being synonymous with *H. Jacqui-*

noti, and describes a new species under the name of *H. Heynemanni*, the commonest form inhabiting all the valleys near the principal harbors at Tahiti, and undoubtedly included among Gould's varieties of *bursatella*. In the seventh volume he doubts *H. coarctata* and *H. turricula* being synonyms of *H. streptaxon*.

Mr. Pease, in his list of Polynesian land shells (P. Z. S., 1871), refers *H. coarctata*, *H. excavata*, *H. streptaxon* and *H. turricula* to the synonymy of *H. bursatella*, and adds *H. cavernula* to the synonymy of *H. Jacquinoti*, Pfr. He also records *H. Heynemanni*, Pfr., and *H. Oceanica*, Le Guill., as distinct species, unknown to him. He doubts *H. Jacquinoti*, which Pfeiffer assigns to the Marquesas, being a Society Island species. I am inclined to believe it inhabits the Austral Islands, and not Marquesas.

L. BURSATELLA, Gould.

Helix bursatella, Gould (part), Proc. Bost. Soc. Nat. Hist., 1846, p. 175; Expl. Ex. Shells, p. 51 (part). Pfeiffer, Mon. Hel., i, p. 185 (part); iii, p. 142 (as restricted). Chemnitz, ed. 2d, Pl. CXXV, figs. 23–25. (*Endodonta*) Albers, Die Hel., p. 189. Reeve, Conch. Icon., Pl. CXI, fig. 635. (*Pitys*) H. and A. Adams, Gen. Moll., ii, p. 113. (*Endodonta*) Paetel, Cat. Conch., p. 91.

Helix turricula, Hombron and Jacquinot, Voy. Pol. Sud, Mol., Pl. VI, figs. 21–24.

Pitys bursatella, Pease (part), Proc. Zool. Soc., pp. 452, 475. Frauenfeld, Verh. Zool. Bot. Ges. Wien, 1869, p. 873.

In 1861, I gathered numerous examples of this species at Tahiti, but, as previously mentioned, my specimens of *Libera* were more or less intermixed, so I cannot state the precise locality where I took the specimens.

It may be distinguished by its semiglobose form, rather elevated dome-like spire, crowded, slightly arcuate riblets, flattened and rather smooth base, and the absence of spiral striæ. There are six to seven internal laminæ.

Major diam. $7\frac{1}{2}$ mill.

L. COARCTATA, Pfeiffer, Plate II, fig. 10.

Helix bursatella, Gould (part), Proc. Bost. Soc. Nat. Hist., 1846, p. 175; Expl. Ex. Shells, p. 51.

Helix coarctata, Pfeiffer, Proc. Zool. Soc., 1849, p. 128; Zeit. Malak., 1849, p. 74. (*Endodonta*) Albers, Die Hel., p. 89.

Helix cavernula, Hombron and Jacquinot, Voy. Pol. Sud, Moll., Pl. VI, figs. 33–36. Chemnitz, ed. 2d., No. 781, Pl. CXXV, figs. 29–31. Pfeiffer, Mon. Hel., iii, p. 143. (*Pitys*) H. and A. Adams, Gen. Moll., ii, p. 113.

Helix streptaxon, Reeve, Conch. Icon., Pl. CXII, fig. 641. Pfeiffer, Mon. Hel., iv, p. 154. (*Endodonta*) Paetel, Cat. Conch., p. 95.

Common and diffused throughout several valleys on the north and east side of Moorea. On the ground in forests.

The spiral, raised striæ will readily distinguish it from *L. recedens* and *L. gregaria*, inhabiting the same island. They vary some in the height of the spire, and some

have the riblets more distant than others. Examples with receding body-whorl are not infrequent. A variety (local) occurs which is uniform whitish.

L. RETUNSA, Pease, Plate II, fig. 8.

Helix retunsa, Pease, Proc. Zool. Soc., 1864, p. 670. Pfeiffer, Mon. Hel., v, p. 220.
Pitys retunsa, Pease, Proc. Zool. Soc., 1871, p. 475.

Mr. Pease's type specimens were collected by me on the south side of Tahiti, where it is not uncommon beneath rotten wood.

This remarkable shell differs from the preceding species in having rounded whorls, the last one neither carinated nor angled, and in the absence of the lamina in the palate. The spire, which is more or less elevated, is truncate, dome-shaped; whorls 6–7, cancellated with fine, crowded, revolving, raised lines, and radiating, distant, delicate, obliquely curved riblets. Parietal region with a single, elongate lamina, and a small one on the columella. Color whitish or yellowish horn-color, above tessellated, and the base with waved, radiating stripes, reddish brown.

Diam. 4, height 2–3 mill.

L. HEYNEMANNI, Pfeiffer, Plate II, fig. 9.

Helix Heynemanni, Pfeiffer, Mal. Blat., 1862, p. 151; Mon. Hel., v, p. 219.
Pitys Heynemanni, Pease, Proc. Zool. Soc., 1871, p. 475.
Patula Heynemanni, Schmeltz, Cat. Mus. Godeff., v, p. 93.
Helix bursatella, Gould (part), Proc. Bost. Soc. Nat. Hist., 1846, p. 175.

Very abundant in several valleys on the northwest part of Tahiti, where they live beneath loose stones and decaying wood.

There is not the slightest doubt in respect to this common species having been collected by Wilkes' naturalists, who carefully explored that part of Tahiti. Examples sent to Mr. Pease were by him referred to *bursatella*, Gould. Some sent to one of my English correspondents were also referred to Gould's species. On the other hand, a lot forwarded to the Museum Godeffroy, were by Prof. Mousson identified with Pfeiffer's *Heynemanni*.

Although Mr. Pease quotes *Heynemanni* as distinct, yet it is evident from his remarks on the Tahiti species that he did not identify the shells received from me as being that species.

It may be characterized by its exceedingly fine transverse and revolving raised striæ, which are so closely set as to impart a silky lustre to the shell. Pfeiffer, who does not allude to the concentric lines, merely says "leviter striata." The spire, which varies slightly in height, is depressed dome-shaped, whorls 6–7, nearly planulate, submargined, the last one *not* descending and acutely carinated. The convex base is cancellated the same as above. There are two parietal laminæ, the lower one the shorter, four in the palate, three conspicuous, deep-seated, beneath the keel, and one above not so conspicuous and sometimes obsolete. A small one on the columella. Color whitish or luteous, rarely uniform brownish, generally profusely spotted and

undulately striped with chestnut-brown. The revolving striæ are sometimes nearly obsolete.

Diam. 5–5½, height 2½–3½ mill.

L. GREGARIA, Garrett, Plate II, figs. 6, 6 *a*, 6 *b*.

Shell small, umbilicated, solid, orbicular, depressed, not shining, closely and obliquely striated with small, regular, slightly biarcuate, rough riblets, which are more crowded on the base; whitish corneous, tessellated and undulately rayed with chestnut-brown; spire depressed dome-shaped, apex flattened; suture moderately impressed; whorls seven, slightly convex, narrow, slowly and regularly increasing, last one acutely carinated, sometimes descending a little below the penultimate whorl; base flatly convex, concave on the boundaries of the umbilicus; umbilicus (in adolescence) wide, exposing all the whorls, one-third the major diameter of the shell; in adults strongly constricted by an acute expansion of the last whorl; aperture small, oblique, depressed, irregular rhomboid-luniform; laminæ 5–6, two in the parietal region, elongate, of equal length, one columellar, two in the palate beneath the keel, short, conspicuous, one above the keel, inconspicuous and occasionally absent; peristome acute, straight, basal margin continuous with the acute umbilical constriction; columella short, concave, receding.

Major diam. 7, height 3½ mill.

Hab.—Moorea.

I discovered two colonies of this very distinct species in two valleys on the southwest part of Moorea. They were congregating in immense numbers on the under side of loose stones. Though carefully searched for, I failed to detect them in any other part of the island. No other species of this genus occurs in the same location with the shells under consideration.

With the exception of a slight difference in the elevation of the spire, they are very uniform in all their specific characters.

L. RECEDENS, Garrett. Plate II, fig. 7.

Shell small, umbilicated, not shining, rather solid, depressed, orbicular, with thin, crowded, slightly oblique, rough, elevated striæ, which are finer and more closely set on the base; dark chocolate-brown, with or without yellowish horn-colored tessellations and undulated stripes; spire depressly convex, apex flattened; suture linearly impressed; whorls seven, very little convex, narrow, slowly and regularly increasing, last one carinated, gradually descending below the periphery of the penultimate whorl; base convex, concavely indented at the axis; umbilicus (in adolescence) freely exposing all the whorls, a little more than one-third the greater diameter of the shell; in adults the umbilicus is constricted to about one-third that of adolescent examples; aperture small, depressed, oblique, irregularly rhomboid-luniform; laminæ six, two on the parietal region, elongate, the lower one deeply seated, a stout one on

the columella, two short conspicuous ones in the palate between the keel and base, and a less conspicuous one above; peristome thin, straight, the lower margin continuous with the umbilical constriction; columella short, concave, receding.

Major diam. $5\frac{1}{2}$, height $2\frac{1}{2}$ mill.

Hab.—Moorea.

Very abundant beneath decaying vegetation, and restricted to the lower part of one valley on the west side of Moorea, and the only species found in that location.

The deflection of the last whorl below the periphery of the penultimate whorl, which is an accidental character in some of the species, *is constant* in this. The persistence of this feature, together with the fine, crowded striæ, dark color, absence of concentric lines, as well as difference in the internal laminæ, are its most essential characters.

Genus ENDODONTA, Albers.

This genus was instituted by Dr. Albers for a peculiar group of small Helices inhabiting the Sandwich Islands, the type of which is *Helix lamellosa*, Fer. Five species are known to inhabit that group; all of which are characterized by their lenticular form, acutely carinate periphery, large umbilicus, subrhomboid or securiform aperture, which is garnished with two parietal, one columellar, and three or four palatal laminæ.

Some of the Society Islands species are very closely related to the Sandwich Islands shells in shape, and the existence of one or more deeply seated laminæ in the palate; the latter character was overlooked by Pfeiffer, Pease, and the writer, when describing the different species inhabiting the group.

They are all very widely umbilicated, the last whorl carinated or angulate, and all, with one exception, have one or two parietal laminæ; the lower one, when two are present, is always shorter, and owing to its being deeply seated has hitherto been overlooked. The aberrant species are *Helix fabrefacta*, Pease, which is without laminæ, and *H. obolus*, Gould, which has a single one on the parietal region; otherwise the shape of the shells is quite similar to the others. The laminæ are not so prominent as in the typical species, and are distinctly represented in the different stages of growth, but, excepting those on the last two whorls, are gradually absorbed by the animal.

They inhabit all the islands except Tahiti and Moorea, where they are represented by a distinct group of Helices, the type of which is *Helix bursatella*, Gould. They are all ground species, and are very numerous in certain favorable localities.

E. Huaheinensis, Pfeiffer. Plate II, figs. 26, 26 *a*, 26 *b*, 26 *c*.

Helix Huaheinensis, Pfeiffer, Zeit. Mal., 1853, p. 55; Mon. Hel., iii, 640.

Endodonta Huaheinensis, Pfeiffer, Vers., p. 129. Albers, Die Hel., ed. 2, p. 9. Pease, Proc. Zool. Soc., 1871, p. 474. Paetel, Cat. Conch., p. 91.

Patula Huaheinensis, Schmeltz, Cat. Mus. Godeff., v, p. 93.

This species is abundant in all the large valleys on Huaheine. Though widely

diffused over the island, it has not, so far as known, been detected in any other location.

On breaking away about one-fourth or one-third of the last whorl, there may be observed a second lamina on the penultimate whorl, and two or three in the palate beneath the keel, and frequently one above. On exposing these deeply seated laminæ, the aperture is precisely like the Sandwich Islands types.

This shell may be distinguished by its depressed convex spire, flattened whorls, and the color, which is dull corneous, is profusely spotted and striped with reddish brown. In adults the peristome is gently and regularly curved from the termination of the keel to the columellar region.

E. FICTA, Pease. Plate II, figs. 25, 25 *a*, 25 *b*.

Helix ficta, Pease, Proc. Zool. Soc., 1864, p. 669. Pfeiffer, Mon. Hel., v, p. 223.

Endodonta ficta, Pease, Proc. Zool. Soc., 1871, pp. 455, 474.

This species is confined to Tahaa, not "Raiatea," as stated by Pease, where it occurs plentifully, associated with *E. fabrefacta*.

Besides the constant single parietal lamina mentioned by Pease, there is a second one deeply seated in the palate between the keel and base of the shell.

As compared with the preceding species, which it closely resembles in texture, color and markings, it is larger, has one more whorl, the umbilicus wider and its margin more acutely angulate, and the aperture more decidedly rhomboidal in outline. The upper surface of the last whorl is more or less distinctly concave or sulcated next to the suture, a character not observed in *Huaheinensis*.

E. FABREFACTA, Pease.

Helix fabrefacta, Pease, Proc. Zool. Soc., 1864, p. 669. Pfeiffer, Mon. Hel., v, p. 190; vii, p, 210; Novit. Conch., fasc. xxxvi, p. 505, Pl. CVIII, figs. 28–31.

Endodonta fabrefacta, Pease, Proc. Zool. Soc., 1871, p. 474.

Patula fabrefacta, Schmeltz, Cat. Mus. Godeff., v, p. 207.

Patula conicava, "Mousson," Schmeltz, Cat. Mus. Godeff., iv, p. 72. Paetel, Cat. Conch , p. 89.

Helix conicava, Pfeiffer, Mon. Hel., vii, p. 480 (name only).

A common species, confined to four large valleys on Raiatea, and one on the east coast of Tahaa. On the ground in forests.

This is one of the aberrant species previously alluded to, which in the type is entirely destitute of internal laminæ. In every other particular, it cannot be distinguished from the typical *Endodonta*.

Dr. Pfeiffer has given an accurate description and figures of this species in the "Novitates Conchologicæ."

It attains a larger size than given by the above author. My largest examples are nearly 9 mill. in the greatest diameter by 4 in height. They vary some in the elevation of the spire, and the brown spots are occasionally absent. The spire is always more or less concave in outline, and the broad umbilicus is funnel-shaped, with planu-

late walls. In adults there are eight flat whorls, the last three subconcave, and the aperture is a nearly equally four-sided square.

Var. PICEA, Garrett.

This variety, which I have distributed to my correspondents under the name of *Pitys picea*, differs none from the type, except in being smaller and the parietal wall unilaminate. The aperture is also vertically narrower.

Not infrequent on the west side of Raiatea.

E. OBOLUS, Gould.

Helix obolus, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 175; Expl. Ex. Shells, p. 53, fig. 50. Pfeiffer, Mon. Hel., i, p. 187.
Endodonta obolus, Albers, Die Hel., ed. 2d, p. 90. Pease, Proc. Zool. Soc., 1871, p. 474.
Pitys obolus, H. and A. Adams, Gen. Moll., ii, p. 114.
Patula obolus, Schmeltz, Cat. Mus. Godeff., iv, p. 72. Paetel, Cat. Conch., p. 93.
Helix acetabulum, Pease, Proc. Zool. Soc., 1861, p. 242. Pfeiffer, Mon. Hel., v, p. 222.
Endodonta acetabulum, Pease, Proc. Zool. Soc., 1871, p. 474.
Pithys? celsa, Pease, Jour. de Conch., 1870, p. 396.
Endodonta celsa, Pease, Proc. Zool. Soc., 1871, pp. 455, 474.
Helix celsa, Pfeiffer, Mon. Hel., vii, p. 260.
Patula Barffi, Garrett, Schmeltz, Cat. Mus. Godeffr., v, p. 93.
Patula intermixta, "Mousson," Schmeltz, Cat. Mus. Godeff., v, p. 93.

This variable species, which is confined to Raiatea and Huaheine, is plentiful and widely diffused over the two islands.

Dr. Gould's habitat, "Taheiti," is undoubtedly wrong. Having personally explored every valley on Tahiti and Moorea, I did not find a single example of this type of Helices. His specimens were probably from Raiatea. Dr. Gould describes it as follows:—

"T. parva, discoidea, deorsum compressa, supra planulata, infra concava, radiatim minutissima et inæqualiter striata, fusco-ferruginea, piceo tessellata; spiræ anfr. $5\frac{1}{2}$, supra excavati, ultimus superne costato-carinatus; apertura subrhomboidea, fauce lamella unica secundum anfractum penultimum volventi. Lat. $\frac{1}{5}$, alt. $\frac{1}{3\,0}$ poll." (Gould).

The above description accords well with the shells under consideration, and the "supra excavata" agrees better with the Raiatea shells than those from Huaheine. But the above author's reference to *Planorbis vortex* as similar in shape renders the identification beyond doubt.

I am fully convinced that Pease's *acetabulum* is specifically the same as Gould's species.

Mr. Pease's diagnosis, which is rather obscure, I reproduce:—

"T. parva, planorboidea, superne leviter convexa vel plana; umbilicus amplus, cyathiformis; utrinque subtiliter radiato-striata, ad peripheriam et umbilici marginem

carinato-costata, subtus subobsolete costata; anfr. 6, carinato-rotundati, seriebus radiantibus pilorum brevium muniti, suturis bene impressis. Apertura subrhomboidea, lamella unica in anfr. penultimo munita. Testa saturati castaneo et fulvo fusco tessellata. Diam. 5, axis 2 mill." (Pease).

I collected Mr. Pease's type specimens at Huaheine; and, though he was well aware of the fact, yet he gave the wrong habitat "Tahiti" to this and several other new species obtained on the former island.

The base is never "carinato-costata." It is rounded or faintly angulate. His "pilorum-brevium" exists in immature examples only.

Eight years after receiving from me a lot of Raiatea specimens of this species he published his "*Pithys ? celsa*" (l. c.). His description is as follows:—

Testa discoidea, late umbilicata, radiatim tenuiter, regulariter rugoso striata, concentrici irregulariter sulcata aut tenuiter costata; spira depresso elevata, convexa; anfr. 7, rotundato-convexi, plerumque angulati, ultimus ad peripheriam rotundatus; umbilicus $\frac{1}{10}$ diametri occupans; apertura vix obliqua subcircularis, lamella unica volvente instructa; perist. simplex rectum; radiatim fusco et albido tessellata. Diam. 6, alt. 3 mill." (Pease).

The following year he redescribes it under the name of "*Endodonta celsa*" (l. c.), without referring to his former diagnosis. I repeat his description:—

"T. orbicularis, solidiuscula, late umbilicata, tenuissime radiatim creberrime striatula, rufo et albido pallide tessellata; spira elevata, apice obtusiusculo, nucleus rufescenti-fuscus, sutura bene impressa; anfr. 7, convexi, interdum concentrice elevato-striati, rarissime sulcati aut angulati, ultimus ad peripheriam obtuse angulatus, subtus rotundatus; apertura obliqua, fere circularis, lamella unica in anfr. penultimo munita. Diam 7, alt. $3\frac{1}{2}$ mill." (Pease).

He gives the correct habitat "Raiatea." It will be observed that there is some discrepancy between the two descriptions of *celsa*, proving it to be a variable species. His measurement, 6 mill., is correct, but his last one, 7 mill., is larger than any specimen known to me.

Having a second time gone over the same ground and collected hundreds of specimens, both on Raiatea and Huaheine, I do not hesitate, after a careful study of the numerous examples, to add both *acetabulum* and *celsa* to the synonymy of *obolus*.

I am not positive, but I think I am correct in referring Mousson's *intermixta* (which I collected at Raiatea) to Gould's species. My *Baxfii*, MS., is the Huaheine shell.

This species, in the shape, and the absence of palatal laminæ, is nearly intermediate between *Endodonta* and those species of *Patula* with the single parietal lamina.

The height of the spire varies from a perfect plane to a depressed cone, hence a deeper or shallower umbilicus. They also vary in the distinctness of the periphery-keel, and some have that part of the shell obtusely angular, without the slightest

indication of a keel. Rarely they exhibit slight traces of spiral riblets, but the shallow sulcation on the upper surface is not infrequent. Immature shells have usually radiating, distant, thin, deciduous, lacerated or hirsute membraneous riblets both above and beneath. The color is greenish corneous, with small spots and stripes of reddish brown. Raiatea examples are more variable than Huaheine specimens. The whorls, 6–7, are marked by fine, not smooth, striæ of growth. The very wide umbilicus is more than half the diameter of the shell. The base of the last whorl is either rounded or slightly angulated, and the aperture is subcircular in full-grown shells or subrhomboidal in immature examples.

E. CRETACEA, Garrett. Plate II, figs. 27, 27 *a*, 27 *b*.

Pitys ficta, Garr. (not of Pease). Schmeltz, Cat. Mus. Godeff., v, p. 223 (ex. Garr.).

Shell very broadly umbilicated, rather solid, depressed, lenticular, finely striated, dull whitish, with small, irregular, scattered brown spots; spire depressed convex, or subplanulate, with flat outlines; apex subacute; suture linear; whorls $6\frac{1}{2}$–7, planulate, narrow, slowly and regularly increasing, the last two slightly concave, acutely carinate on the periphery, not descending in front; beneath the keel oblique, planulate; base acutely angulate; umbilicus very large, funnel-shaped, with planulate walls; aperture oblique, quadrate; parietal region with a single revolving lamina, and one in the throat between the keel and basal angle; peristome simple, acute, straight; columella simple.

Major diam. 6, height 2 mill.

Hab.—Borabora Island.

Common, but very local and restricted to the above island, where they live on the ground in forests at an altitude of about 600 feet above sea-level.

It is shaped and colored nearly the same as *fabrefacta*, but is smaller, more depressed, and the last whorl is not so deep, and the flattened space between the two angles is more oblique. They also differ in the outlines of the spire, and the two internal laminæ are constant.

Many of the adult shells have the umbilicus covered with a thin brownish yellow membrane, which, in all I examined, was perforated. Probably the animal, as in *Libera*, oviposits into the umbilicus and covers the opening with the membrane, and the perforations were made when the young escaped I searched, in vain, for intact membranes in hopes of discovering either the eggs or young shells. This peculiar feature has, so far, only been observed in the Borabora shells. I copy the following from the Jour. de Conch., 1865, p. 395:—

"L'Endodonta lamellosa, Fér., dépose ses œufs dans l'ombilic, ainsi qu'une autre espèce des îles Sandwich communiquée par M. Harper Pease: dans cette dernière l'ombilic était couvert d'une sorte d'épiphragme" (O. A. Mörch).

E. Taneæ, Garrett.

Pitys Taneæ, Garr., Proc. Cal. Acad. Sciences, 1872, iv, p. 204. Proc. Acad. Nat. Sci. Phil., 1873, p. 234, Pl. III, fig. 65.

Patula Janeæ, Schmeltz, Cat. Mus. Godeff., v, p. 93. (Typ. err.)

Helix Janeæ, Pfeiffer, Mon. Hel., vii, p. 481. (Name only ex. Schmeltz.)

Helix Taneæ, Pfeiffer, l. c., p. 482. (Name only.)

Helix Boraborensis, Pease, MS., Mus. Pease, 1863.

Very abundant and restricted to Borabora and Maupiti, where they live on the ground in forests.

When I wrote my description of this species I had only half a dozen specimens of *Boraborensis* named from Pease's types. Having subsequently gathered several hundred of the latter species at Borabora, I find the two species gradually intergrade. Maupiti specimens are remarkably uniform in shape, sculpture and coloration. The Borabora shells, on the contrary, are subject to considerable variation in all the above characters. In order to incorporate the characters of the latter, I redescribe it as follows:—

Shell widely umbilicated; depressed, lenticular, rather thin, corneous or brownish horn-color, irregularly spotted and rayed with rufus-brown, rarely unicolored; sculpture consisting of very small, rude, crowded, oblique, subarcuate, raised striæ, with remote larger ones intermixed; the latter sometimes absent in the Borabora shells, and in the immature they are frequently membraneous and lacerated; spire more or less convex, sometimes nearly planulate, rarely depressly conoid; apex mucronated, generally, suture lightly impressed, occasionally margined by the continuation of the periphery-keel. Whorls $5\frac{1}{2}$–$7\frac{1}{2}$, convex or subplanulate, very narrow, slowly and regularly increasing, last one not deflected in front, rarely sulcate above, periphery acutely carinate; base more or less distinctly angulate, rarely rounded; umbilicus funnel-shaped, a little more than a third the greater diameter of the shell. Aperture oblique, irregularly rhomboid-luniform; parietal region with two laminæ, the lower one short and rarely visible without breaking away a portion of the peristome; palate with two to four deeply seated lamelliform teeth, the one above the keel sometimes absent; peristome thin, simple, straight; columella not expanded.

Major diam. $4\frac{1}{2}$, height $1\frac{1}{2}$ mill.

The above measurement is the average size of Maupiti specimens. The Borabora shells are sometimes a trifle larger, and some have the spire more elevated. The young are occasionally dark brownish, with rounded whorls, which are conspicuously undulated, and the striæ very uniform. Individuals are not infrequent which have the whorls more tightly coiled, the striation finer and very uniform in size. In the latter, the body-whorl is deeper and the keel more obtuse.

The umbilical membrane or diaphragm, alluded to in my remarks on *cretacea*, is frequent in the Borabora shells, but not observed in those from Maupiti.

Genus STENOGYRA, Shuttleworth.

S. TUCKERI, Pfeiffer.

Bulimus Tuckeri, Pfeiffer, Proc. Zool. Soc., 1846, p. 30; Mon. Hel., ii, p. 158; (*Opeas*) Vers., p. 156. Reeve, Conch. Icon., Pl. LXVIII, sp. 481; (*Opeas*) Cox, Mon. Aust. Land Shells, p. 69, Pl. XIII, fig. 9. Brazier, Quar. Jour. Conch., i, p. 272. Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 393.

Stenogyra Tuckeri (*Opeas*), Albers, 265. (*Opeas*) Frauenfeld, Verh. Zool. Bot. Wien., xix, p. 873. Pease, Proc. Zool. Soc., 1871, p. 473.

Bulimus junceus, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 191; Expl. Ex. Shells, p. 76, fig. 87. Pfeiffer, Mon. Hel., ii, p. 220.

Stenogyra juncea, Mousson, Jour. de Conch., 1869, p. 340; 1870, p. 126; 1871, p. 15; 1873, p. 106. Pease, Jour. de Conch., 1871, p. 93; Proc. Zool. Soc., 1871, p. 473. (*Opeas*) Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 90. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 19.

Bulimus Walli, Cox, Cat. Aust. Land Shells, p. 24. Pfeiffer, Mon. Hel., vi, p. 99.

Stenogyra Upolensis, Mousson, Jour. de Conch., 1865, p. 175. (*Obeliscus*) Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., iv, p. 29.

Bulimus Upolensis, Pfeiffer, Mon. Hel., vi, p. 100.

Stenogyra novemgyrata, Mousson, Jour. de Conch., 1870, p. 126. (*Subulina*) Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v. p. 90.

Bulimus novemgyratus, Pfeiffer, Mon. Hel., viii, p. 138.

A very common species, distributed throughout all the Polynesian islands, and extends its range to the East Indies. They range from near high-water mark to over 2000 feet above the level of the sea.

For further remarks on this species, see my paper on the Cook's Islands land shells, published in the Journal of the Academy of Natural Sciences of Philadelphia.

Genus PARTULA, Ferussac.

The genus *Partula*, so far as known, is restricted to the Pacific islands, ranging from the Marquesas throughout all the groups as far west as New Guinea; but is not found in New Zealand, nor New Caledonia, nor Australia. North of the equator, they occur at the Caroline, Pelew and Marianne Islands, the latter being the northern limit of the genus. They are entirely absent from the Sandwich group, where they are represented by the closely allied genus *Achatinella*. Neither do they occur on any of the low coral islands.

It is now a well-known fact that each group, with one exception, is inhabited by peculiar or endemic species. The solitary exception is *P. hyalina*, which has its metropolis in the Austral Islands; is also found on Mangaia, one of the Cook's group, as well as at Tahiti.

The Society Islands, which are inhabited by nearly one-half of the known species of *Partula*, may be regarded as the central point of distribution of the genus. Out of fifteen subgenera lately established by Dr. Hartman, ten are found in the group, and, besides the type, which is peculiar, seven of his subgeneric types are found nowhere else. It is also the only group possessing strictly terrestrial or ground

species; and nowhere else do we find so great a variety of forms in the shape of the shells, which varies from the almost globose *P. Hebe* to the slender *P. elongata*. It is no less noteworthy that nearly one-half of the species have a "button-like" tooth on the parietal wall, and some have a tooth-like projection on the inner margin of the peristome, which gives the aperture an auriculate shape—a feature found in no other group. The Society Islands shells are also the most variable in color, and more than half of the species are more or less spirally banded—a character rarely found in the extra-limital species.

The distribution of the various species throughout the group presents many very interesting features, which are, indeed, worthy of more attention than I am able to give to the subject. With three exceptions, each island is inhabited by distinct species, and some possess peculiar types or subgenera. The specific centre or metropolis of nearly all the species is clearly defined by the profusion or concentration of individuals in limited areas. In some instances we find two, rarely three, species having their centres of distribution in a single valley, and in some cases one is entirely restricted to its headquarters, whilst the others have spread into two or more valleys.

On Tahiti, the largest island in the group, we find eight species only, six of which are endemic. One (*P. clara*), which has a limited range, appears to be gradually becoming extinct. Four species (*P. filosa*, *nodosa*, *producta* and *stolida*) are each restricted to a single valley. All the above species are well-defined, and exhibit but little variation. On the contrary, *P. Otaheitana*, which has its centre of distribution in Fautana valley, has spread all round the island, and is subject to so much variation that no less than fourteen species have been proposed for the different forms. Two species (*P. hyalina* and *attenuata*) are common to other islands; the former, as before mentioned, is found in the Austral and on one of the Cook's group; the latter occurs on Raiatea, but does not inhabit the two intermediate islands. It is a noteworthy fact that, notwithstanding both species have spread nearly all round Tahiti, yet they have not developed a single varietal feature, but, on the contrary, are remarkably uniform in all their specific characters. One would naturally suppose that the southern examples of *P. hyalina*, which are subject to lower temperature and different formation (*elevated coral reefs*), would have exhibited some degree of variation to distinguish them from the Tahitian specimens living in a higher temperature on a volcanic island.

Here we have three species ranging round the island, and all subject to the same conditions of life, yet two have not shown the slightest tendency to depart from the typical forms, and the other, which is very variable in its metropolis, has developed many local varieties. The above facts, which are common to other species, seem to suggest that physical conditions are not the primary cause of variation, but that it is the operation of some unknown law.

Moorea, which is separated from Tahiti by a channel only eight miles wide, is

inhabited by four species found nowhere else. One (*P. taeniata*), which has its metropolis in a large valley on the north coast, is, like *P. Otaheitana*, a very variable species, and has spread round three-fourths of the island, and, like the latter species, has developed local varieties which have received distinct names. *P. lineata*, which inhabits that part of the island *not* occupied by *taeniata*, is nearly as variable as that species. *P. elongata*, which is confined to the same portion of the island as *lineata*, is less variable, and where it comes in contact with *taeniata* we find hybrids between the two so common as to suggest a certain degree of fertility in the intermediate forms. *P. Mooreana*, which is always reversed, is confined to a single valley and shows but slight variation.

One peculiar feature in the Tahiti and Moorea shells is the profusion of sinistral forms which are entirely absent from the leeward islands in the group.

Huaheine, like Moorea, possesses four endemic species, all of a different type from those inhabiting the preceding two islands. Two (*P. arguta* and *annectens*) are restricted to two valleys, and the latter, like *P. clara*, appears to be gradually becoming extinct. Both species are remarkably uniform in all their specific characters. On the contrary, the other two species (*P. rosea* and *varia*) have spread nearly all over the island, and are subject to considerable mutation. It is worthy of remark that dentated species, which are so common at all the islands except Borabora, do not occur on Huaheine.

Raiatea, though only fourteen miles long and nearly half as broad, is inhabited by twenty species of *Partula*, being one-half of the number assigned to the whole group, and eighteen are found nowhere else. These, according to Dr. Hartman's divisions, include not only the type, but five out of his fifteen subgenera, two of which are peculiar to the island. Nearly all the species are remarkably prolific, and, with few exceptions, are subject to greater or less variation. Ten of these varieties being local, have usually been regarded as distinct species. Six species are strictly terrestrial. The fine large typical *P. faba*, which has its metropolis at Utuloa on the north end of the island, has spread into nearly all of the valleys, and is equally as variable in all parts of the island as in its headquarters. On the adjacent island of Tahaa we find the same species represented by distinct varieties. Two of the Raiatea species (*P. turgida* and *P. attenuata*), though having an extensive range, do not vary in a single feature; the former, like *P. clara* and *annectens*, seems to be dying out. Three species (*P. callifera*, *citrina* and *auriculata*) are restricted to single valleys, and the two former, like *turgida* and *attenuata*, are very uniform in color and shape. All the other species, though having special headquarters, have a greater or less range over two or more valleys, and ten species have produced local varieties.

Passing over the narrow lagoon to Tahaa, the latter about the size of Huaheine we find four endemic species, and, as before stated, two local varieties of *P. faba;* one

occupying that part of the island nearest to the metropolis of the type, and the other, which is frequently dentated, is distributed over the remaining portion of the island. The beautiful *P. bilineata* is confined to a single valley on the eastern coast, and *P. planilabrum*, which has its headquarters in the large Haamene valley, just to the southward of the home of the former species, has established a colony in the valley on the north side of the one occupied by *P. bilineata*. *P. umbilicata*, which shares the metropolis of *planilabrum*, has, like that species, avoided intruding in the home of *bilineata*, but to the northward it occupies several valleys, slightly overlapping the northern range of *P. virginea*, which latter has its metropolis on the west coast, and, like *P. umbilicata*, ranges throughout several valleys north of its headquarters.

Borabora, the smallest island inhabited by *Partula*, possesses a single species of a peculiar type, which has spread nearly all over the island without developing a single local variety.

Hybrids between *P. elongata* and *P. tæniata*, and between *P. Garrettii* and *P. Thalia*, are so common where those species come in contact, that I am inclined to believe they possess a certain degree of fertility. I have also detected several hybrids between *P. faba*, var. *subangulata*, and *P. virginea*; one between the arboreal *P. imperforata* and the terrestrial *P. lugubris*; two between *P. lineata*, var. *strigosa*, and *P. tæniata*; about a dozen between the arboreal *P. faba* and the terrestrial *P. radiata*; a number between *P. faba* and *P. fusca*, and many between the latter and *P. navigatoria*, as well as many between the latter and *P. faba*. I failed to detect hybrids between the Tahitian species, and found none at Huaheine.

The examination of the animals of the various species has convinced me that they possess no reliable external features that will aid in their determination. The coloration in all the species varies from pale cinereous, through all the intermediate shades, to black or dusky slate. The arboreal species are generally lighter colored than the ground species, and have a more expanded creeping-disk. The animals of *P. arguta*, *annectens*, *turgida* and *attenuata*, have the ocular tentacles longer and more slender than the other species, and the exudation of mucus is much more copious and more viscid or tenacious than usual, resembling in that respect the same difference as exists between the typical Helices and the arboreal Naninæ.

P. Otaheitana, Bruguière.

Bulimus Otaheitanus, Bruguière, Ency. Meth., i, p. 347. Lamarck, Anim. sans Vert., Desh. ed., p. 281. Kuster, Pl. XIV, figs. 5–6. Pfeiffer, Mon. Hel., ii, p. 71, part.

Helix perversa, etc., Chemnitz, ix, p. 108, Pl. CXII, figs. 950, 951.

Helix Otaheitana, Dillwyn, Desc. Cat. Shells, ii, p. 935. Wood, Ind. Test., Pl. XXXIV, fig. 110.

Partula Otaheitana, Ferussac, Prod., p. 66. Reeve, Conch. Syst., ii, Pl. CLXXV, fig. 16; Conch. Icon., Pl. III, figs. 13 *a*, 13 *b*. Jay, Cat. Shells, 1839, p. 57. Pfeiffer, Mon. Hel., iii, p. 448. Pactel, Cat. Conch., p. 104. (*Helena*) Hartman, Cat. Part., pp. 9, 10, with woodcut; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 184.

Partulus Otaheitanus, Beck, Ind. Moll., p. 58.
Helix Vanicorensis, Quoy and Gaimard, Voy. Astrolabe, ii, p. 115, Pl. IX, figs. 12–17.
Bulimus Vanicorensis, Lamarck, Anim. sans Vert., Desh. ed., p. 282. Pfeiffer, Mon. Hel., ii, p. 71.
Partulus Vanicorensis, Beck, Ind. Moll., p. 57.
Partula Vanicorensis, Pfeiffer, Mon. Hel., iii, p. 446. Paetel, Cat. Conch., p. 104.
Bulminus isabellinus, Pfeiffer, Proc. Zool. Soc., 1846, p. 39; Mon. Hel., ii, p. 70.
Partula isabellina, Reeve, Conch. Icon., sp. 10, Pl. II, fig. 8 *b*. Pfeiffer, Mon. Hel., iii, p. 448. Paetel, Cat. Conch., p. 104.
Bulimus amabilis, Pfeiffer, Proc. Zool. Soc., 1846, p. 38; Mon. Hel., ii, p. 71.
Partula amabilis, Reeve, Conch. Icon., sp. 8, Pl. II, figs. 8 *a*, 10. Pfeiffer, Mon. Hel., iii, p. 448. Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104.
Partula rubescens, Reeve, Conch. Icon., Pl. III, fig. 12. Pfeiffer, Mon. Hel., iii, p. 446. Pease, Proc. Zool. Soc., 1871, p. 473.
Partula Reeveana, Pfeiffer, Proc. Zool. Soc., 1852, p. 137; Mon. Hel., iii, p. 447. Chemnitz, ed. 2d, Bul., Pl. LXV, figs. 10, 11.
Partula Taheitana, Gould, Expl. Ex. Shells, Pl. LXXXIV, fig. 91. Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92.
Partula lignaria, Pease, Proc. Zool. Soc., 1864, p. 671; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 160. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92.
Partula rufa, Carpenter (not of Lesson), Proc. Zool. Soc., 1864, p. 675. (*Helena*) Hartman, Cat. Part., p. 10.
Partula affinis, Pease, Amer. Jour. Conch., 1867, p. 224; Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., v, p. 92. Pfeiffer, Mon. Hel., viii, p. 204.
Partula sinistrorsa, Pease, MS. Coll. Pease, 1863. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. Pfeiffer, Mon. Hel., viii, p. 209. Gloyne, Quar. Jour. Conch., i, p. 337.
Partula sinistralis, Pease, MS. Coll. Pease, 1863. Paetel, Cat. Conch., p. 104. Pfeiffer, Mon. Hel., viii, p. 209.
Partula crassa, Pease, MS. Coll. Pease, 1863.
Partula brevicula, Pease, MS. Col. Pease, 1863.
Partula perversa, Pease, MS. Coll. Pease, 1863.
Partula turricula, Pease, MS. Coll. Pease, 1863 (not *turricula*, Pease, in Amer. Jour. Conch., 1872).
Partula varia, Carpenter (not of Broderip), Proc. Zool. Soc., 1864, p. 675.
Partula Pacifica, Hartman (not of Pfeiffer), Cat. Part., p. 10.
Partula diminuta, Hartman (C. B. Adams ??), l. c., p. 10.

The metropolis of the typical *Otaheitana* is about two miles up Fautana valley, on the northwest part of Tahiti, where it is very abundant on the trunks and foliage of trees and bushes. The above-mentioned valley being close to the principal harbor which was frequented by the early navigators, it was undoubtedly where Bruguière's type was obtained.

The Fautana shells, which are very variable in size, shape, and color, are never ornamented by spiral bands, and about one-third of the specimens are sinistral. The parietal tooth is nearly always present in the adults, and the peristome, though usually

white, is frequently pinky flesh-color. The prevailing colors are straw-yellow, reddish fulvous, light chestnut, frequently with the spire more or less tinted with reddish and often with longitudinal strigations. The spire is more or less produced, and the aperture varies some in size and shape.

The shape of the shell varies from abbreviate-ovate to elongate-ovate, as the following measurements will show:—

Length 21, diam. 10 mill.	Dextral sp.
Length 16, diam. 10 mill.	Dextral sp.
Length 20, diam. 10 mill.	Sinistral sp.
Length 16, diam. 9 mill.	Sinistral sp.

All the old authors refer to sinistral forms. The elongated dextral shells were described under the names *Vanicorensis* and *Reevcana*.

In a valley about two miles west of Fautana, there exists in abundance the variety (?) *lignaria*, Pease, which, though described as dextral, is nevertheless very frequently sinistral. Though not attaining quite so large a size as the Fautana shells, it differs none in shape, but is usually darker colored and more strigated, as well as exhibiting one to three transverse reddish chestnut bands. The lip is always white, and the parietal tooth is very seldom absent. The inosculation with *Otaheitana* is so complete that it cannot be even separated as a well-marked variety.

To the eastward between Fautana and Papinoo valley, a distance of about eight miles, there are three valleys, all inhabited by Pfeiffer's *amabilis*, a sinistral form which has not a single feature to distinguish it from some of the large turreted Fautana shells. In the first valley, Pfeiffer's species, though not abundant, were very fine specimens. The next valley, known as Pirai, the metropolis of the small dextral *P. filosa*, which occupy the lower part of the valley, is, in the upper part, which trends towards the headquarters of *Otaheitana*, inhabited by the sinistral *amabilis*. A few immature examples were found which were banded like *lignaria*. The only dextral *Partulæ* taken in the two valleys were *filosa*, *attenuata* and *hyalina*.

In the next valley, called Haona, I found the dextral *P. affinis* abundant, and took a few of *amabilis*.

Both Dr. Pfeiffer and Reeve described the latter species from specimens in the Cumingian collection, and both quote Anaa, a low coral island, as its habitat. Having resided about five months on that island, and searched all parts for shells, I did not find a single *Partula* there, or on any other low coral island. Mr. Pease, in his list of Polynesian land shells, assigns it to Tutuila, one of the Samoa or Navigator Islands, but on what authority I do not know. The type is purely Tahitian. Dr. Pactel and Dr. Hartman are the only authors who give the correct locality. Though neither Pfeiffer nor Reeve allude to a parietal tooth, it is, however, very frequently present.

Pease's *affinis*, which cannot be separated from some of the small abbreviated

forms of *Otaheitana*, occurs in greater or less abundance in all the valleys from Haona as far as the southeast end of Taiarapu peninsula, and round the opposite coast as far as Papieri on the southwest of Tahiti proper. In Papinoo I discovered a large colony of *affinis*, many of which had the pinky flesh-colored lip and sinistral form of *Otaheitana*. Far up in the same valley, though common, none but dextral forms were found, and out of thousands taken in the other valleys, not one sinistral example occurred to my notice. In a valley several miles from Papinoo I found a small colony of *affinis*, which were marked by three transverse reddish chestnut bands like *lignaria*. And most singular, no other banded specimens of *affinis* occurred to my notice in any other part of the island. It is the variety *dubia*, Pse., and by Carpenter erroneously referred to *varia*.

Reeve's *rubescens* = *turricula*, Pse., MS., is abundant in Papinoo, and occurs sparingly in all the valleys as far as the southeast end of the island. Like *amabilis* it cannot be separated from the sinistral turreted *Otaheitana*, inhabiting Fautana. It is always sinistral, never banded, and, though usually of a reddish tint, is frequently straw-yellow or fulvous, with or without a reddish or pinky apex. The lip is white or pinky flesh-color. Though described as edentate, some have a small parietal tooth. Reeve gave no locality, and Pfeiffer erroneously cites the Marquesas as its habitat.

Pease's *sinistrorsa* is confined to the south coast of Tahiti proper, where it exists in the greatest profusion in all the valleys and lowland forests for a distance of ten or twelve miles. In the valley which is the limit of the range of the dextral *affinis* I took several specimens of the sinistral *sinistrorsa*. The latter is invariably reversed, dentate or edentate, fulvous with three more or less diffused reddish chestnut bands. Reeve figures the same shell on Plate III, fig. 13 *a*, as *Otaheitana*. Bandless varieties are frequent, and vary from straw-yellow to fulvous or light chestnut, frequently strigated and the lip white. The latter varieties differ none from the true *Otaheitana* of Fautana.

It is worthy of remark that in that part of the district of Papieri, occupied by *sinistrorsa*, is also the headquarters of the terrestrial *P. producta*, a dextral species, which is always edentate, and exhibits the fasciation of the former.

After passing to the westward of the range of the typical *sinistrorsa*, which presents the same features for a distance of ten or twelve miles, it suddenly exhibits a tendency to a change in its becoming more stunted, more solid, always dentated, and the bands, one to three, are sharply defined on a pale ground. It is the *sinistralis* of Pease, MS., and occupies two valleys.

In the next large valley, called Faahuaite, on the southwest coast, we find Pease's *crassa* (MS.), which is also a sinistral shell, always dentated, solid, more tightly coiled than *sinistrorsa*, and the body-whorl is more flattened. It is rarely marked by a single narrow submedian chestnut band. In the same valley, but more inland, occurs a smaller form, which is, I suppose, the *P. brevicula*, Pse., MS.

The following valley, named Punaavia, is the metropolis of the beautiful *P. nodosa*, which also exhibits three bands. Far above the restricted range of the latter, where the valley turns towards the head of Fautana, the home of the typical *Otaheitana*, I took a few examples of a *Partula*, similar to, but larger than *crassa*. The next valley is the habitat of *lignaria*.

Perhaps it may, by some, be suggested that I ought to have been more conservative in my treatment of the *Otaheitana* group, which, to say the least, is a very perplexing one to separate into species or even well-marked varieties. However, I think *P. affinis*, *rubescens*, *crassa*, *sinistrorsa*, and perhaps *lignaria*, may rank as varieties which intergrade with the typical *Otaheitana*. But those who believe that species, like genera, have no sharply defined boundaries, but are connected to others by transitial forms, will in all probability consider them distinct, but closely allied species, but of less value than *P. hyalina*, *filosa* and *nodosa*.

P. LINEATA, Lesson. Plate III, fig. 83.

Partula lineata, Lesson, Voy. Coquille, p. 324, Pl. VII, figs. 8, 9. Reeve, Conch. Icon., Pl. II, fig. 7. Pfeiffer, Mon. Hel., iii, p. 449. Carpenter, Proc. Zool. Soc., 1864, p. 675. Schmeltz, Cat. Mus. Godeff., iv, p. 72.

Partulus torosus, Beck, Ind. Moll., p. 57.

Partulus lineatus, Albers, Die Hel., p. 187.

Partula strigosa, Pfeiffer, Proc. Zool. Soc., 1856, p. 384; Malak. Blatt., 1856, p. 244; Mon. Hel., iv. p. 509.

Partula alternata, Pease, MS. Coll. Pease, 1863.

Partula vexillum, Pease, Amer. Jour. Conch., 1866, p. 198; 1867, p. 81, Pl. 1, fig. 8; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., viii, p. 196.

Partula nodosa, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675 (= *alternata*). Pease, Proc. Zool. Soc., 1871, p. 473 (part). Schmeltz, Cat. Mus. Godeff., v, p. 92 (part). Gloyne, Quar. Jour. Conch., i, p. 337.

Partula stenostoma, Hartman (not of Pfeiffer), Cat. Part., p. 10.

Partula suturalis, Hartman (Pfeiffer?), l. c.

This beautiful arboreal species is found in great profusion in Vaianai valley, on the southeast coast of Moorea, where it occurs in company with *P. Mooreana* and *P. elongata*. It also exists in considerable numbers in a small valley about two miles to the westward, associated with *P. taeniata* and *elongata*.

I first discovered this species in 1861, and obtained several hundred specimens, *all* collected on the eastern side of the stream that flows through the valley of Vaianai. They were *all* dextral, and were so described by Pease, under the name of *vexillum*. On a second visit, in 1875, I took over 2000 examples, *all* gathered on the *western* side of the stream, and was surprised to find many sinistral forms among them. At the same time I found about a dozen specimens, *all* sinistral, in a large semicircular valley on the opposite side of the island. They were probably stragglers from Vaianai.

It is noteworthy that no reversed *Partulæ* were found in any other part of the island except on the western side of the stream in Vaianai, and the above-mentioned

stragglers taken on the opposite coast. The same side of the stream is also the home of the sinistral *P. Mooreana.*

Several miles to the eastward of Vaianai, in a large valley named Oahumi, it is found equally as abundant as in the former location. The Oahumi shells, which are slightly modified (= *strigosa* = *alternata*), gradually inosculate with *lineata.* It occurs, also, sparingly in a valley more to the eastward, where it is associated with *P. tæniata* and *striolata.*

The type is luteous, or straw-yellow, rather shining, and girdled by two or three narrow, equidistant reddish chestnut bands. The shell is comparatively thin, compressly perforated, more or less wrinkled by incremental striæ, and the fine spiral incised lines are generally obsolete on the last whorl. The produced spire is a trifle more than half the length of the shell. The rather small aperture is truncately oval, and the parietal tooth is seldom absent. The white peristome is rather thin, moderately expanded, slightly reflected, lightly labiated within, and rarely with a slight sinus above. The columellar lip is receding above at its junction with the parietal wall.

Length 19, diam. 10 mill., which are about the average dimensions.

The following color-varieties occur:—

Var. *a.* Uniform chestnut-brown, sometimes approaching blackish brown, with a pale sutural line. Rare.

Var. *b.* Dark chestnut-brown, with a wide, median, luteous band on the body-whorl. Rare.

Var. *c.* Luteous or straw-yellow, with a very broad, deep, chestnut band on the middle of the body-whorl. Rare.

Var. *d.* Luteous, with faint, longitudinal, light fulvous-brown strigations. Common.

The sinistral examples, of which I obtained about fifty, exhibit the same variation as the dextral shells.

Contrary to the opinion of Messrs. Pease and Hartman, I follow Reeve, Pfeiffer and Carpenter in referring this species to Lesson's *lineata*, which that author erroneously accredited to Oualan or Strong's Island, one of the Caroline group. Lesson either collected his specimens at Moorea, or he received them from some of the foreign residents at Tahiti, and, as was *too* frequently the case with the naturalists of the exploring expeditions, had forgotten the correct habitat.

The following is a translation of Lesson's brief description:—

"Shell perforated, oblong-oval, luteous, with two fulvous bands; spire conical; whorls six, slightly convex, last one as long as the spire; aperture oval; peristome expanded; columellar margin much thickened within. Length 8, diam. 5 lines. *Hab.*—Oualan Island."

So far as the description goes, it coincides with the pale, banded, edentate Moorea shells.

Reeve describes it as follows:—

"Shell acuminately oblong, umbilicated, rather thin, whorls six in number, spirally very finely striated, light fulvous, subtransparent, encircled with two distant chestnut bands. Lesson, Voyage de la Coquille, p. 324, Plate VII, figs. 8, 9. *Hab.*—Friendly Islands" (Reeve).

Like Lesson, he does not mention the parietal tooth, which is well-expressed in his figure. His description is from examples in the Cumingian collection, and is certainly the Moorea shell. His habitat, "Friendly Islands" = Tonga, *is* incorrect. Only one species (*P. subgoncheila*) inhabits that group.

Pfeiffer, in his "Monographia Heliceorum," vol. iii, gives a more detailed description of *lineata*, also from specimens in Cuming's collection, and cites "Oualan et Eimeo" (= Moorea) as location, but in his subsequent volumes omits the latter location. Like the two former authors, he does not allude to the parietal tooth. However, he makes the same omission in two other dentated species.

A careful comparison of Pfeiffer's descriptions of *P. stenostoma* and *lineata* has convinced me that they cannot refer to the same species. The latter undoubtedly is the Moorea shell. The former, according to the measurements, refers to a larger and more robust shell, being, in fact, the same size and proportion as *P. planilabrum*. In Pfeiffer's original diagnosis he says "læte castaneo bilineata," and, in his Monograph, "læte castaneo trilineata."

The Oahumi shell which was described by Pfeiffer under the name of *strigosa*. is, by some authors, affiliated with *P. nodosa*, an entirely different species, inhabiting a limited area in Tahiti. Mr. Gloyne and Dr. Hartman first pointed out its very close relationship with *P. vexillum* = *lineata*. Indeed, the inosculation is so complete that they must be considered one and the same species.

The Oahumi shells are usually a trifle smaller, not so frequently dentated, and are much more conspicuously strigated than the Vaianai shells. The spiral bands, of which there are one or two, seldom three, on the body-whorl, are very frequently interrupted, which, with the conspicuous strigations, gives the shell a somewhat tessellated appearance. All the color-varieties alluded to in my remarks on the Vaianai shells are also found in Oahumi, but the uniform dark-colored ones are more frequent, besides one of a uniform white color, not decorticated, of which I took three examples.

So far as I can ascertain, there has been no figure published of Pfeiffer's *strigosa*. He gives the Admiralty Islands as its habitat. There are *no* species of the type he describes found in the western Pacific. It is undoubtedly a Society Islands species, and I fully agree with Dr. Hartman in referring it to the shells under consideration. The description is sufficiently near to justify the identification. But I cannot share

the above author's views in regard to Pfeiffer's *P. suturalis* being = *strigosa*. There is too much discrepancy in the two diagnoses to warrant their affiliation.

P. LUTEA, Lesson.

Partula lutea, Lesson, Voy. Coquille, p. 325. Pfeiffer, Mon. Hel., iii, p. 453. Pease, Proc. Zool. Soc., 1871, p. 473. (*Ilia*) Hartman, Cat. Part., p. 8 (with woodcut); Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 184, part.

Bulimus luteus, Deshayes, Fer. Moll., ii, p. 123, Pl. CLVIII, figs. 17, 18. Pfeiffer, Mon. Hel., ii, p. 229.

Partula solidula, Schmeltz, Cat. Mus. Godeff., v, p. 92 (not of Reeve).

Partula lilacina, Pfeiffer, Proc. Zool. Soc., 1856, p. 334. Pease, Proc. Zool. Soc., 1871, p. 334.

This, the only species of *Partula* inhabiting Borabora, is peculiar to and widely diffused throughout that island. They occur in larger numbers both on the trunks and foliage of trees and bushes. Notwithstanding its wide range over the island, it has not developed a single local variety. In fact it exhibits less variation than some of the species at the other islands which are restricted to single valleys.

It may be recognized by its rather solid texture, ovate-conical form, rather short spire, large inflated body-whorl, small compressed perforation and white suboval aperture. The parietal region is never toothed. The peristome is white, moderately expanded, not very thick, labiated within, surface rather flat and sloping. Columellar lip subnodose. Color whitish corneous, luteous, fulvous brown, with or without a brown or purple-brown apex. It is never banded. Some are more elongate than others, as the following measurements will show:—

Length 20, diam. $10\frac{1}{2}$ mill.
Length 16, diam. $10\frac{1}{2}$ mill.

A careful comparison of *lutea* with Pfeiffer's description of *lilacina* has convinced me of the correctness of Dr. Hartman's views in uniting the two species. I have no examples of the "lilacina" color mentioned by Pfeiffer. If the determination is correct, his habitat "Marquesas" is certainly wrong.

Reeve's *P. solidula* is decidedly distinct, and of a different type from *lutea*. Reeve's figure closely resembles Pease's *compacta*, but wants the parietal tooth of that species. Pfeiffer describes the peristome as "late expansum, margine dextro superne sinuato, tum strictusculo," which agrees with Reeve's figure, but not with *lutea*.

P. HEBE, Pfeiffer.

Bulimus Hebe, Pfeiffer, Proc. Zool. Soc., 1846, p. 39; Mon. Hel., ii, p. 68. Chemnitz, ed. 2d, Pl. LXIV, figs. 7, 8.

Partula Hebe, Reeve, Conch. Icon., sp. 25, Pl. IV, fig. 25. Pfeiffer, Mon. Hel., iii, p. 453. Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. (*Œnone*) Hartman, Cat. Part., p. 9 (with woodcut); Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 183, 193.

Partula globosa, Pease, MS. (Mus. Pease, 1863). Gloyne, Quar. Jour. Conch., i, p. 338. Schmeltz, Cat. Mus. Godeff., v, p. 207.
Partula ventricosa, Garrett, MS.
Partula Hebe, var. *bella*, Pease, Proc. Zool. Soc., 1871, p. 473.

The specific centre of the type of this small white species is in the large valley of Faaloa, on the eastern coast of Raiatea, where it is found in great profusion on the foliage of bushes. From this central point it has migrated to the northward, where it is found, though less abundant, in an adjacent valley, associated with the typical *P. dentifera*. About two miles to the southward, on the same side of the island, in a large valley called Opoa, is found in large numbers the pretty variety *bella* (= *globosa*, Pse.), which has passed over a range of wooded hills into a large valley on the south coast, where it occurs in limited numbers in company with *P. formosa*. In another valley, some distance to the northward, on the west coast, we find another variety (= *P. ventricosa*, Garr.), which, though shaped like the type, in color closely resembles *P. crassilabris*, a ground species.

The type, which is *always* decorticated, may be readily distinguished by its ovate-globose shape, uniform white color, not shining, constant prominent parietal tooth and subcircular aperture. Associated with the type are two varieties; one, pinky white, is very rare; the other, white with an orange-colored spire, is rather rare. The variety *bella*, Pse., differs none from the type, except in having the spire more or less light red and the body-whorl most generally with a very thin, smooth, pale yellowish horn-colored epidermis. The variety *ventricosa*, Garr., is usually a little smaller than the type, not decorticated, and is more variable in color, but never banded. The ground color varies from whitish to fulvous, rarely with a reddish spire, but more frequently with the apex of a purple-brown hue.

P. IMPERFORATA, Pease, MS. Plate III, fig. 53.

Partula imperforata, Pease, MS. Coll. Pease, 1863. Paetal, Cat. Conch., p. 104. Pfeiffer, Mon. Hel., viii, p. 209. (*Astræa*) Hartman, Cat. Part., p. 8; Obs. Gen. Part., Bul. Mus. Com. Zool., ix., pp. 183, 195 (part).
Partula dentifera, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675. Hartman, Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 186 (part).
Partula recta, Pease, MS. (not *recta*, Pease, in Amer. Jour. Conch, 1868) Coll. Pease, 1863.
Partula auriculata, var., Carpenter, Proc. Zool. Soc., 1864, p. 675.
Partula Raiatensis, Garrett, MS.

Shell imperforated or compressly umbilicated, solid, oblong-conic, somewhat shining, with rather smooth, irregular, incremental striæ and closely set delicate spiral incised lines, which are more or less evanescent on the body-whorl; color, pale straw-yellow, luteous, or fulvous, with or without a rosy apex; spire conical, with subplanulate outlines, about half the length of the shell; suture sometimes margined by a rugose white line; whorls 5–5½, flatly convex, the last one convex or convexly rounded; base

imperforate, rimate or compressly umbilicated; aperture subvertical, oblong, obauriform, white, sides nearly parallel; parietal wall with a more or less well-developed tubercular tooth; peristome white, thick, moderately expanded, surface concave, heavily labiated within, strongly contracted above, forming a rather profound sinus, and generally subdentate next to the emargination; columellar lip subnodose.

Length 21, diam. 12 mill.

Var. *a*. Uniform chestnut-brown. Rare.

Var. *b*. Base and sutural band chestnut-brown. Somewhat rare.

Var. *c*. With a broad, median, chestnut-brown band. Rather rare.

This species is restricted to Toloa and Hapai valleys on the west coast of Raiatea, where it is abundant on foliage.

Like all the species, they differ some in size, shape, and some have the spire more abbreviated than others. The type which inhabits Hapai valley is nearly always imperforated and may be distinguished from the imperforate *formosa* by its smaller size, gibbous columella and parietal tooth. Carpenter confused it with *dentifera*, an allied species, confined to the opposite side of the island.

P. Raiatensis = *recta*, Pse., MS., which inhabits Toloa, was by Carpenter referred to *auriculata*, a species of a different type. Dr. Hartman unites it to *dentifera*. After a careful study of about 2000 specimens of the two species, I have annexed the Toloa with the Hapai shell. The only difference between the two is that *Raiatensis* is usually lighter-colored, seldom imperforated, and the apex is much more frequently rose-red. It is, I think, more nearly related to the dentated *virginea*, inhabiting the neighboring island, than to *dentifera*.

The latter species is much more frequently edentate on the parietal wall, the lip thicker, more angulated on the surface, and the labial tooth much larger and more acute. It is never banded, and the apex is *not rose-red*, but is frequently tinged with lemon-yellow.

P. COMPACTA, Pease.

Partula compacta, Pease, Amer. Jour. Conch., 1866, p. 200; 1867, p. 81, Pl. I, fig. 9; Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. Pfeiffer, Mon. Hel., viii, p. 207. (*Nenia*) Hartman, Cat. Part., p. 7; Obs. Gen Part., Bul. Mus. Com. Zool., ix, pp. 181, 192.

Partula auriculata, var., Carpenter, Proc. Zool. Soc., 1864, p. 675.

Partula callifera, Gloyne (not of Pfeiffer), Quar. Jour. Conch., i, p. 338.

The metropolis of this common, solid, arboreal species is in Hamoa valley, on the east coast of Raiatea, the home of *P. callifera*. It is confined to the lower half of the valley and has not spread any to the southward, but to the north it is found in limited numbers in two small valleys.

Its principal features are its ovate-conic form, constant parietal tooth, subauriculate aperture, which is much contracted by a thick deposit of callus in the inner margin

of the lip, which latter is very broad, flattened and conspicuously sinuous above. The columella is more or less gibbous. Color yellowish corneous, very rarely fulvous or fasciated.

Had Reeve alluded to a parietal tooth in his description and figure of *P. solidula*, I would not have hesitated to refer *compacta* to that species.

P. CLARA, Pease. Plate III, fig. 75.

Partula clara, Pease, Proc. Zool. Soc., 1864, p. 671; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 159. (*Pasithea*) Hartman, Cat. Partula, p. 11; Obs. Gen. Partula, Bul. Mus. Com. Zool., p. 181, vol. ix.

A rare species, found on foliage in the upper portions of the valleys in the southwest part of Tahiti. Like *P. annectens*, of Huaheine, and *P. turgida*, of Raiatea, it is gradually becoming extinct.

It is a small species (16 mill.), corneous, sometimes with darker stripes, and more rarely with one or two transverse chestnut bands. The aperture is always edentate.

P. GARRETTII, Pease. Plate III, fig. 48.

Partula Garrettii, Pease, Proc. Zool. Soc., 1864, p. 672; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 158. Schmeltz, Cat. Mus. Godeff., v, p. 207. (*Helena*) Hartman, Cat. Part., p. 10; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 182.

Partula gonocheila, Schmeltz (not of Pfeiffer), Cat. Mus. Godeff., v, p. 92.

The specific centre of this small and well-marked species is Vaioara, on the west coast of Raiatea, where it exists in prodigious numbers on bushes. It has spread north and south of its metropolis, and in the former direction has slightly overlapped the southern range of *P. Thalia*, and hybrids between the two species are quite common. To the southward it ranges about one mile, where it extends a short distance up a valley which is the home of *P. citrina*.

Its principal characters are its small size, contracted aperture, rounded or angulated peristome and nodulous columella, which latter is, as it were, pushed in towards the aperture. The parietal region is very rarely toothed. It is whitish or pale yellowish horn-color, rarely fulvous or light brown, and sometimes the apex is purple-brown. A variety with a brown base and sutural band is not infrequent.

P. TURGIDA, Pease. Plate III, fig. 74.

Bulimus turgidus, Pease, Proc. Zool. Soc., 1864, p. 670; 1871, 473. Pfeiffer, Mon. Hel., vi, p. 12.

Partula turgida (*Echo*), Hartman, Cat. Part., p. 12; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 188.

Though widely diffused over Raiatea, it is nevertheless excessively rare. It is much larger, stouter and darker-colored than *P. arguta*, the nearest allied species.

Like *P. clara* and *P. annectens*, it appears to be gradually becoming extinct.

It *does not* inhabit "Tahiti," as stated by Pease.

P. FABA, Martyn. Plate III, figs. 78, 79, 80, Vars.

Limax faba, Martyn, figs., etc., Pl. LXVII. Chenu, Bibl. Conch., ii, p. 24, Pl. XXIV, fig. 2 *a*.

Auris Midæ fasciata, Chem., ix, p. 44, Pl. CXXI, fig. 1041.

Helix faba, Gmelin, p. 3625. Dillwyn, Desc. Cat. Shells, ii, p. 906. Wood, Ind. Test., Pl. XXXIII, fig. 47. Enc. Brit., vi, p. 449, ed. 1817.

Voluta auris Malchi, var., Gmelin, p. 3437.

Voluta fasciata, Dillwyn, Desc. Cat. Shells, i, p. 502.

Bulimus faba, Lamarck, Anim. sans Vert. (Desh. ed.), p. 284. Pfeiffer, Mon. Hel., ii, p. 73.

Bulimus Australis, Bruguière, Enc. Meth., i, p. 347.

Partula australis, Ferussac, Pro. p. 66. Chenu, Lec. Conch., p. 241, fig. 899. Jay, Cat. Shells, p. 57.

Partula faba, Sowerby, Zool. Beech. Voy., p. 144, Pl. XXXVIII, fig, 4. Reeve, Conch. Syst., ii, p. 175, figs. 13, 14. Pfeiffer, Mon. Hel., iii, p 446. Reeve, Conch. Icon., Pl. I, figs. 5 *a*, *b*, *c*. Woodward, Man. Moll., p. 164, Pl. XII, fig. 13. Chenu, Man. Conch., i, p. 434, fig. 3195. Adams, Gen. Moll., ii, p. 145, Pl. LXXV, fig. 2 *a*. Pease, Jour. de Conch., 1870, p. 400; Proc. Zool. Soc., 1871, pp. 458, 473. Paetel, Cat. Conch., p. 404. Schmeltz, Cat. Mus. Godeff., v, p. 92. Hartman, Cat. Part., p. 6 (with woodcut); Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 182. Excl. *citrina*.

Partulus australis, Beck, Ind. Moll., p. 37.

Bulimus inconstans, Muhlfeldt (teste Anton, p. 40).

Bulimus tricolor, Muhlfeldt (teste Anton).

Partula faba, var. *subangulata*, Pease, Jour. de Conch., 1870, p. 401; Proc. Zool. Soc., 1871, pp. 458, 473 (Pl. III, fig. 79).

Partula ventricosa, Pease, MS. Coll. Pease, 1863.

Partula amanda, Garrett, MS., Pl. III, fig. 78.

Partula dubia, Garrett, MS., Pl. III, fig. 80.

Partula bella, Pease, MS. (*not bella*, Pease, in Proc. Zool. Soc., 1871, p. 473.) Ex. Hartman.

Partula brunnea, Pease, MS. Ex. Hartman.

Partula pallida, Pease, MS. Ex. Hartman.

Partula marginata, Garrett, MS.

Partula biangulata, Pease, MS. Ex. Hartman.

Partula propinqua, Pease, MS. Ex. Hartman.

The metropolis of the well-known typical *faba* is Utuloa, on the north end of Raiatea, the specific centre of *P. auriculata*. It is very abundant on the trunks and foliage of trees and bushes. From its headquarters it has migrated throughout all parts of the island, and notwithstanding its wide diffusion it presents the same features in every location.

It was first obtained when Capt. Cook visited Raiatea in 1769, and first figured by Martyn in his unique "Universal Conchologist."

The type varies from straw-yellow to brownish yellow or fulvous, with a broad basal and narrow sutural chestnut-brown band. The most common bandless variety is of the normal color varied with longitudinal darker strigations. A variety of a uniform, whitish horn-color, as well as one of a uniform chestnut-brown, sometimes approaching

black, is not infrequent. The lip is white, and the apex frequently tinted with purple-black.

They vary considerably in shape, as the following measurements will prove:—

Length 25, diam. 14 mill.
Length 25, diam. 12 mill.

The average dimension is 25 by 13 mill. Out of about 6000 examples I found but one possessing the parietal tooth. Hybrids between this species and *radiata*, *fusca* and *navigatoria* are not uncommon.

On the south end of Tahaa, an island inclosed in the same reef which encircles Raiatea, is the headquarters of Pease's var. *subangulata* (Pl. III, fig. 79), which has spread throughout several valleys.

As compared with *faba*, it is smoother, more glossy, thinner, and exhibits different color-variations. The type is reddish brown, with a yellowish sutural band, and the peristome is purple-brown, frequently spotted with white. A variety with a narrow subsutural and subbasal band of a dark chestnut-color on a pale greenish yellow ground is not uncommon. Uniform reddish chestnut and pale greenish yellow varieties with white lips are frequent. Like the typical *faba*, it is frequently strigated and edentate on the wall of the aperture.

The specific centre of the var. *amanda* = *ventricosa* (Pl. III, fig. 78) is on the northeast portion of Tahaa, where it occurs in the greatest profusion, and has migrated throughout all parts of the island, except that portion inhabited by var. *subangulata*.

In shape it differs none from the latter form, but is frequently dentated on the parietal wall, and in some valleys on the north coast, the latter character is constant and = *dubia*, Garr. (Pl. III, fig. 80). The usual color is pale yellowish corneous, light or dark fulvous, with a white or flesh-tinted lip. A beautiful variety occurs which has a wide, median, reddish chestnut band. A more common variety is found with two narrow, reddish chestnut bands. Chestnut-brown varieties are not uncommon. The rarest variety is fasciated the same as the typical *faba*.

P. AURICULATA, Broderip.

Partula auriculata, Broderip, Proc. Zool. Soc., 1832, p. 33. Muller, Syn. Test., p. 33. Reeve, Conch. Syst., ii, p. 175, figs. 7, 8. Jay, Cat. Shells (1832), p. 57. Carpenter, Proc. Zool. Soc., 1864, p. 675 (part). Paetal, Cat. Conch., p. 104. Pease, Amer. Jour. Conch., 1866, p. 20. Schmeltz, Cat. Mus. Godeff., iv, p. 71. (*Nenia*) Hartman, Cat. Part., p. 7, with woodcut; Obs. Gen. Part., Bul. Mus. Com. Zool. ix, pp. 180, 186, 192.

Partula tabulana, Anton, Verz. Conch., p. 40.

Partulus auriculatus, Beck, Ind. Moll., p. 58.

Bulimus auriculatus, Pfeiffer, Symb., i, p. 80; ii, p. 111.

Bulimus Otaheitanus, Pfeiffer, Mon. Hel., ii, p. 71 (part).

Partula Otaheitana, Reeve (not of Bruguière), Conch. Icon., Pl. II, fig. 11 *a*, *b*.

Partula robusta, Pease, MS. Coll. Pease, 1863.

Partula Tahitana, Schmeltz (not of Gould), Cat. Mus. Godeff., v, p. 92. Paetal, Cat. Conch., p. 104. Pease, Proc. Zool. Soc., 1871, p. 473.
Partula maura, Muhlfeldt (teste Anton).

This well-defined arboreal species is restricted to Utuloa, on the north end of Raiatea, where it exists in great profusion, associated with the typical *P. faba*.

In referring to the synonymy and references, it will be observed that this well-characterized species has been frequently confounded with the widely different *P. Otaheitana*, a Tahitian species.

It is accurately figured by Reeve, in his monograph of *Partula*, on Plate II, figs. 11*a* and 11*b*. His fig. 11*c* is *P. crassilabris*, Pease.

In all probability Mr. Reeve had access to Broderip's type specimens, so there cannot be much, if any, doubt of this being the shell the latter had before him when he wrote his description. He may have, as the late Mr. Pease suggested, included more than one species in his diagnosis. His habitat is certainly wrong. The shells were collected by Cuming at Raiatea, not "Huaheine," and, as was too frequently the case, he had forgotten the exact locality.

So far as I can ascertain, there has been no description published, except the brief diagnosis of Broderip. It may be characterized as follows:—

Shell narrowly umbilicated, ovate-conic, scarcely shining, with rather rough incremental striæ, decussated by crowded spiral incised lines, which become evanescent on the last whorl; color varying from whitish to different shades of luteous horn-color, frequently with longitudinal darker strigations; spire rather short, plano-convexly conical, half the length of the shell; apex somewhat obtuse and frequently tinted purple-brown; suture impressed; whorls five, slightly convex, the last one more or less turgid; aperture rather small, subvertical, obauriform, much contracted by the labiated peristome; parietal wall with or without a white tubercular tooth; peristome thick, moderately expanded, white, frequently margined with light brown, contracted above, and the extremities frequently united by a ridge of callus.

Length 18, diam. 12 mill.

The above are about the average dimensions, though they vary some in the relative proportions of height to diameter. Examples of a light brown, or deep blackish brown, or the latter color with a median yellowish band on the body-whorl, are not infrequent.

Dr. Hartman inadvertently cites "Tahiti" as its habitat, and in his chart correctly assigns it to Raiatea.

P. Mooreana, Hartman. Plate III, fig. 55.
Partula Mooreana, Hartman, Proc. Acad. Nat. Sci. Phila., 1880, p. 229; (*Helena*) Cat. Part., p. 10; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p 184.

This arboreal species is abundant, and restricted to Vaianai valley, on the southeast coast of Moorea, where it shares the metropolis of *P. vexillum*, Pse.

It may be characterized by its elongate-ovate form, rather thin texture, constant parietal tooth, planulate-conical spire, which equals half the length of the shell, pale luteous color, with darker apex. It is *always* sinistral, and the white expanded lip is rather thin and moderately incrassated.

A variety with three narrow pale brown revolving bands is not infrequent.

It is closely related to some of the sinistral forms or varieties of *P. Otaheitana*, particularly with Pease's *P. crassa*, which, though of the same shape, is more solid, rougher, and the fine crowded spiral incised lines which extend over the whole surface of the former are nearly obsolete on the latter.

P. FORMOSA, Pease, MS. Plate III, fig. 49.

Partula formosa, Pease (Mus. Pease). (*Astræa*) Hartman, Cat. Part., p. 8; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 182, 191.

The metropolis of this very distinct species is in Fatimu, or on the southwest part of Raiatea. It occurs in vast numbers on bushes on the lowlands near the seashore, becoming more scarce inland, where it is found associated with *P. Hebe*, var. *bella*. It ranges north as far as Vaiau valley, becoming less and less abundant as the distance increases from its specific centre. It may be characterized as follows:—

Shell large, imperforated, solid, elongate-ovate, striated, shining, pale yellowish white, straw-yellow or fulvous; spire conical, with nearly flat outlines, spirally striated with fine, crowded, incised lines, half the length of the shell, and frequently tinged with rose-red; suture slightly impressed, margined with a rugose, white line; whorls five and a half, flattened, the last one large, convex; aperture oblong, subvertical, obauriform; peristome white, rather widely expanded, declivous, external margin angularly ridged, inner margin strongly labiated, acutely dentate, and contracted above the denticle; parietal region thinly glazed, edentate; columellar lip closely appressed over the umbilical region.

Length 25, diam. 13 mill.

Its large size, edentate parietal region, sharp labial tooth and closed umbilicus will readily distinguish it. It is never ornamented with bands.

P. CALLIFERA, Pfeiffer. Plate III, fig. 82.

Partula callifera, Pfeiffer, Proc. Zool. Soc., 1856, p. 333; Mon. Hel., iv, p. 511. Carpenter, Proc. Zool. Soc., 1864, p. 675. Pease, Proc. Zool. Soc., 1871, p. 473. (*Astræa*) Hartman, Cat. Part., p. 8; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 180.

Partula megastoma, Pease, MS. Schmeltz, Cat. Mus. Godeff., v, p. 92.

Partula callistoma, Schmeltz, l. c., p. 207; vi, p. 81.

A well-characterized species, restricted to the higher portion of Haamoa valley, on the east coast of Raiatea, where it is not uncommon on foliage.

It may be easily determined by its creamy white color, yellow apex, constant parietal tooth, inflated body-whorl, oval or rounded "key-hole" aperture, conspicuous labial tooth and the total absence of epidermis in the adult shells. It is never banded.

P. UMBILICATA, Pease.

Partula umbilicata, Pease, Amer. Jour. Conch., 1866, p. 200; 1867, p. 81, Pl. I, fig. 7; Proc. Zool. Soc., 1871, p. 474. Paetel, Cat. Conch., p. 104. Binney, Proc. Acad. Nat. Sci. Phil., 1875, pp. 245, 247, Pl. XIX, fig. 7 (anatomy). Schmeltz, Cat. Mus. Godeff., iv, p. 71. Pfeiffer, Mon. Hel., viii, p. 207. (*Clytia*) Hartman, Cat. Part., p. 8 (with woodcut); Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 188.

Partula auriculata, var., Carpenter, Proc. Zool. Soc., 1864, p. 675.

The metropolis of this well-defined species is in a large valley, called Haamene, on the east coast of Tahaa, where they are found in prodigious numbers on the foliage of low bushes. It has not spread any to the southward, but, on the other hand, ranges in considerable numbers through all the valleys, except Faa-apa, the home of *bilineata*, as far as Murifanna on the northwest coast, where it is found associated with *P. virginea*.

Its globose-conic form, large umbilicus, constant parietal tooth, rather narrow, slanting lip, subnodose columella and yellowish or brownish horn-color will readily distinguish it.

Var. *a*. Uniform chestnut-brown. Common

Var. *b*. With one or two chestnut-brown bands. Rare.

P. VIRGINEA, Pease, MS. Plate III, fig. 54.

Partula virginea, Pease, MS. Coll. Pease, 1863. Binney, Proc. Acad. Nat. Sci. Phil., 1875, pp. 245, 247, Pl. XIX, fig. 8 (anatomy). Schmeltz, Cat. Mus. Godeff., vi, p. 81. (*Astræa*) Hartman, Cat. Part., p. 8; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 189.

Partula solidula, var., Carpenter, Proc. Zool. Soc., 1864, p. 675. Pease, Proc. Zool. Soc., 1871, p. 473.

The specific centre of this species is in Vaipiti valley, on the west coast of Tahaa, where it occurs in the greatest profusion on the foliage of shrubs. It has extended its range to the northward as far as Murifanna on the north coast, which latter is the limit of the western range of *P. umbilicata*.

It may be described as follows:—

Shell compressly umbilicated, solid, oblong-conic, somewhat shining, yellowish corneous or light fulvous brown; spire convexly conical, half the length of the shell; suture margined by a whitish line; whorls 5–5½, slightly convex; aperture subvertical, oblong, obauriform, rounded below and much contracted by the strongly labiated peristome; parietal wall with a white tubercular tooth which is rarely absent; peristome white, sometimes tinged with carnation, widely expanded, subplanulate, slightly contracted above, and the margins frequently nearly united by a ridge of callus; columellar lip vertical, more or less distinctly nodose.

Length 18, diam. 9 mill.

Var. *a*. Uniform chestnut-brown. Not uncommon.

Var. *b*. Yellowish corneous, with a basal and sutural chestnut-brown band. Very rare.

They vary some in size and length of spire. The nearest allied species is *P. planilabrum*, which is larger, differently colored and inhabits a different station. I have found several hybrids between this species and *P. faba*, var. *subangulata*, Pease.

In referring to the synonymy it will be observed that Carpenter and Cuming regarded it as a variety of Reeve's *P. solidula*. Mr. Pease, accepting their views, catalogued it by the latter name in his list of Polynesian land shells (P. Z. S., 1871, p. 473). Both Reeve's and Pfeiffer's description, as well as Reeve's figure, refer to a more robust species than *virginea*. Moreover, neither of the above authors allude to the parietal tooth, which is seldom absent in the latter species. Reeve's figure very nearly coincides with Pease's *P. compacta*, but that species is always dentate. Hybrids between *P. faba*, var., and *virginea*, which are edentate, very closely resemble Reeve's figure of *solidula*.

P. ARGUTA, Pease. Pl. III, fig. 57.

Bulimus argutus, Pease, Proc. Zool. Soc., 1864, p. 670; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 46.

Partula arguta, Schmeltz, Cat. Mus. Godeff., v, p. 92. Martens and Langk., Don. Bismark., p. 55, Pl. III, fig. 7. (*Echo*) Hartman, Cat. Part., p. 11 (with woodcut); Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 179.

The metropolis of this very fragile species is in the upper portion of a mountain ravine, on the west coast of Huaheine, where it is rather common on the leaves of low shrubs and ferns. It occurs much more rarely in a neighboring valley south of its specific centre. Mr. Pease's habitat "Tahiti," as given in his list of Polynesian land shells, is decidedly wrong.

Though referred by the above author to the genus *Bulimus*, it is, nevertheless, a true *Partula*. The animal, which is viviparous, has very long, slender, ocular tentacles, long lance-pointed foot, and that portion of the animal occupying the whorls of the translucent shells is beautifully maculated with black and white spots on grayish yellow ground. The shell, which is very uniform in all its specific characters, may be readily distinguished by its very thin pellucid texture, ovate form, abbreviated spire, turgid body-whorl, uniform pale yellowish horn-color, thin, slightly expanded lip and large simple aperture.

P. BILINEATA, Pease.

Partula bilineata, Pease, Amer. Jour. Conch., 1866, p. 201; 1857, p. 81, Pl. I, fig. 10; Proc. Zool. Soc., 1871, p. 473. Binney, Proc. Acad. Nat. Sci. Phila., 1875, pp. 245, 247, Pl. XIX, fig. 10 (anatomy). Pfeiffer, Mon. Hel., viii, p. 195. Gloyne, Quar. Jour Conch., i, p. 338. Schmeltz, Cat. Mus. Godeff., vi, p. 81. (*Clytia*) Hartman, Cat. Part., p. 8; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 180, 196.

Partula auriculata, Carpenter (not of Broderip), Proc. Zool. Soc., 1864, p. 675.

This beautiful and well-marked species is confined to Faa-apa valley on the east

coast of Tahaa, where it occurs in abundance on the trunks of a species of wild banana and at the roots of ferns. Mr. Pease cites "Tahiti" as the habitat of this species, which is an error.

It is readily distinguished by its smooth, glossy surface, ovate-conic form, yellowish horn-color, and two revolving chestnut-brown bands, the upper one narrow and subsutural. The subacute apex is sometimes purple-brown and the suture is margined by a narrow, rugose, whitish line. The constant parietal tooth is prominent and the broad white peristome is slightly emarginate above, strongly labiate within, and widely expanded.

Var. *a*. With a single broad median chestnut-brown band. Not common.

Var. *b*. Chestnut-brown with a yellowish horn-colored sutural band. Very rare.

Var. *c*. Uniform yellowish horn-color. Very rare.

They are all remarkably uniform in shape and size.

As compared with *P. auriculata*, with which it has been confused, it is more glossy, smoother, the lip broader, the umbilicus more open and the fasciation different.

It is more nearly connected with *P. planilabrum* and *virginea*.

P. PLANILABRUM, Pease. Plate III, fig. 77.

Partula suturalis, Pease, MS. (not of Pfeiffer).

Partula planilabrum, Pease, Proc. Zool. Soc., 1864, p. 672; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 156. Binney, Proc. Acad. Nat. Sci. Phil., 1865, pp. 245, 247. Schmeltz, Cat. Mus. Godeff., vi, p. 81. Hartman, Cat. Part., p. 7; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 185, 188, 190.

The metropolis of this species is Haamene valley, on the east coast of Tahaa, where it is common, and, though usually lurking beneath decaying vegetation, is sometimes found adhering to the trunks of the wild banana. It is found, though less abundant, in a valley north of its specific centre, but does not occur in the intermediate valley Faa-apa, the home of *bilineata*.

It is larger and more elongated than the latter species, and the surface is not so smooth and shining. The structure of the peristome is similar in the two shells, but the aperture is more elongate. The parietal tooth is constant in adults.

The type is deep chestnut-brown, gradually fading into yellowish corneous towards the sutural line, and the whitish lip is frequently tinged with violet.

Var. *a*. Fulvous yellow, with the basal half of the body-whorl, and a revolving subsutural band, deep chestnut-brown. Not infrequent.

Var. *b*. Uniform pale corneous or light fulvous. Rare.

Like the preceding species it is very uniform in all its specific characters. The fasciation of variety *a* resembles the typical markings of *bilineata*.

P. FILOSA, Pfeiffer. Plate III, fig. 81.

Partula filosa, Pfeiffer, Proc. Zool. Soc., 1851, p. 262; Mon. Hel., iii, p. 450. Chemnitz, ed. 2d, Bul., p. 267, Pl. LXIV, figs. 3, 4. (*Helena*) Hartman, Cat. Part., p. 10; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 182, 183, 196.

Partula lineolata, Pease, Amer. Jour. Conch., 1867, p. 224; Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., v, p. 92. Pfeiffer, Mon. Hel., viii, p. 206.

This small and well-characterized species is restricted to the lower portion of Pirai valley, on the northwest coast of Tahiti, where it is abundant on foliage. Pfeiffer's "habitat in insulis Navigatorum" (= Samoa Isles) is decidedly wrong. The type is peculiar to the Society Isles.

It is a solid, ovate-conic, chestnut-colored shell, marked by longitudinal cinereous strigations, and constant tuberculiform parietal tooth. The aperture is rather small, semi-oval, considerably contracted by the white, convex outer lip. It is never encircled by bands. Examples of a pale straw or flesh tint are not infrequent.

P. CITRINA, Pease. Plate III, fig. 52.

Partula citrina, Pease, Amer. Jour. Conch., 1866, p. 195; Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., vi, p. 81. Pfeiffer, Mon. Hel., viii, p. 200.

Partula faba, var., Carpenter, Proc. Zool. Soc., 1864, p. 675. Hartman, Cat. Part., p. 6; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 180, 195.

This fine arboreal species is restricted to a single valley, called Uparu, on the west coast of Raiatea. I found it abundant in a limited area in the upper portion of the valley. A few stragglers occurred lower down in company with *faba* and *Garrettii*.

Though considered by some authors to be a variety of *P. faba*, I am, nevertheless, fully convinced of its specific value. When I first discovered it in 1861, I took but few examples, in consequence of not penetrating far enough into the valley to find its headquarters. A more extended research in 1873 revealed its specific centre, and I took about eight hundred specimens in various stages of growth, and many of the adults were in a gravid condition.

All of my first collection passed into Mr. Pease's possession, and were so few that I labeled them "a somewhat rare species." There is not the least doubt that the more slender pale varieties of *faba* have repeatedly been confounded with and distributed under the name of *citrina*.

It has been suggested that it may be a hybrid between *faba* and some other species. I only noticed *faba* and *Garrettii* in the lower part of the valley, and *not* in the upper portion, which is the principal haunt of *citrina*.

My largest examples are 25 mill. in length and 12 in diameter. It is *always* of a straw-yellow color, rarely with faint longitudinal darker strigations, and is either lemon-yellow or light red at the apex. It is *never* spirally banded, and the parietal wall is invariably edentate. The oblong white aperture is, including the peristome, half the length of the shell. The ivory-white lip is broadly expanded, planulate, declivous,

strongly labiated, slightly dentate and distinctly emarginate above. The slightly gibbous columella is reflected over the small compressed perforation.

Its uniform straw-yellow color, more slender form, smaller perforation, more reflected columella, and more decided labial tooth, and profounder emargination, will distinguish it from the very variable *faba*.

P. NODOSA, Pfeiffer.

Partula nodosa, Pfeiffer, Proc. Zool. Soc., 1851, p. 262; Mon. Hel., iii, p. 449. Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. (*Helena*) Hartman, Cat. Part., p. 10; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 184, 188, 195.

Partula trilineata, Pease, Amer. Jour. Conch., 1866, p. 195; 1867, p. 81, Pl. I, fig. 1.

Partula nodosa, var. *trilineata*, Pease, Proc. Zool. Soc., 1871, p. 473.

This beautiful arboreal species is restricted to a limited area about two miles up Punaavia valley on the west coast of Tahiti.

I first discovered the location in 1861, and gathered about three hundred examples. On a subsequent visit, nine years later, I secured over eight hundred specimens. It is *entirely* confined to the south side of the stream which flows through the valley, and circumscribed in a narrow area about three-fourths of a mile in length.

When Mr. Pease described his *trilineata*, he gave the correct locality; but, in his list of Polynesian land shells, he wrongly assigns it to Moorea. Dr. Pfeiffer gives Tahiti and Navigator Islands as its habitat. The type is purely Tahitian, and does not occur at the latter group.

It may be characterized by its ovately conical form, solid texture, constant parietal tooth, nodose columella, and widely expanded white peristome, which is flatly convex, very slightly constricted above and strongly lipped within. The color is creamy white or yellow-corneous, generally with narrow, longitudinal strigations of a brownish color, and ornamented with three revolving, narrow, reddish brown bands. About one in two hundred is sinistral. Bandless varieties are not infrequent, and some are fulvous or light chestnut-brown, with a pale narrow sutural band.

P. HYALINA, Broderip.

Partula hyalina, Broderip, Proc. Zool. Soc., 1832, p. 32. Müller, Syn. Test., p. 32. Reeve, Conch. Syst., ii, Pl. CLXXV, figs. 1, 2. Jay, Cat. Shells (1839), p. 57. Reeve, Conch. Icon., Pl. III, fig. 14. Pfeiffer, Mon. Hel., iii, p. 451. Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 18; Jour. Acad. Nat. Sci. Phila., 1881, p. 396. (*Pasithea*) Hartman, Cat. Part., p. 2; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 183.

Bulinus hyalinus, Sowerby, Conch. Illus., fig. 9.

Bulimus hyalinus, Lam., Ed. Desh., p. 284.

Partulus hyalinus, Beck, Index Moll., p. 57.

This well-known arboreal species has its metropolis or specific centre in the Austral group, some three hundred miles south of Tahiti. It occurs also on Mangaia, one of

the Cook's group, about four hundred miles from its metropolis. It is also distributed in limited numbers throughout every valley on Tahiti, but is not found on any other island in the same archipelago. Its extensive range is most remarkable, and it is the only species known to be common to more than one group of islands.

P. PRODUCTA, Pease. Plate III, fig. 51.

Partula producta, Pease, Proc. Zool. Soc., 1864, p. 671; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 156. Schmeltz, Cat. Mus. Godeff., v, p, 92. (*Helena*) Hartman, Cat. Partula, p. 10; Obs. Gen. Partula, Bul. Mus. Com. Zool., ix, p. 185.

This species only occurred to my notice in one valley, on the southwest coast of Tahiti, where it is abundant, lurking beneath decaying leaves and under heaps of loose stones.

The type is yellowish fulvous, and invariably marked by three narrow, revolving, reddish brown bands in the body-whorl, and two on the spire. The rather narrow, dull whitish peristome is moderately reflexed, rounded, and the margins united by a layer of callus on the parietal wall, which latter is edentate. It is always dextral, and the rather long spire equals half, or a trifle more than half, the length of the shell.

Var *a*. Body deep chestnut-brown, with or without a pale sutural band, pale base and bilineated spire.

Var. *b*. Uniform pale fulvous or tawny, with a darker apex.

P. ANNECTENS, Pease. Plate III, fig. 70.

Bulimus annectens, Pease, Proc. Zool. Soc., 1864, p. 671. Pfeiffer, Mon. Hel., vi, p. 48.

Partula annectens, Pease, Proc. Zool. Soc., 1871, p. 473. (*Echo*) Hartman, Cat. Part., p. 12; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 179.

This delicate arboreal species is excessively rare, and has only occurred to my notice in two valleys on the west coast of Huaheine.

It is more fragile and more robust than *P. attenuata*, the nearest allied form. The spire is less than half the length of the shell, and the suture is margined by a white line. The dull whitish peristome is widely expanded. The aperture is never dentate, and the yellow-corneous shell is faintly tinged with greenish.

The animal varies from pale luteous-yellow to light brownish yellow. The soft parts, as seen through the transparent shell, are mottled with slate-colored spots. The foot is about the same length as the shell, and the ocular peduncles are very long and slender.

P. CRASSILABRIS, Pease.

Partula crassilabris, Pease, Amer. Jour. Conch., 1866, p. 199; 1871, p. 81, Pl. I, fig. 6; Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., v, p. 207. Pfeiffer, Mon. Hel., viii, p. 208. (*Œnone*) Hartman, Cat. Part., p. 9; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 181, 192 (excl. *rustica*).

Partula Otaheitana, Reeve, Conch. Icon., Pl. II, fig. 11 *c*, not of Bruguière.

Partula Hebe, var., Carpenter, Proc. Zool. Soc., 1864, p. 675.

The metropolis of this small species is in Hapai valley, on the west coast of

Raiatea, the home of *P. imperforata* and *lugubris*. It is very abundant, lurking beneath decaying vegetation and found associated with the typical form of *P. lugubris*. It has not spread any to the northward, but to the southward it has migrated into two small ravines.

It is shaped very much like *Hebe*, but is smaller, the lip less expanded and the body-whorl not so much inflated. The parietal tooth, which is not constant, is not so prominent as in that species. The color varies from pale horn-color to deep brown or reddish brown, with or without a purple-black apex. The peristome is more rounded, and not so pure a white as in *Hebe*.

A variety with a median yellowish band is not uncommon, which Mr. Pease described as the type. Of the two figures quoted in the synonymy and references, Mr. Reeve's is the most characteristic; that of Mr. Pease is too much elongated.

P. ROSEA, Broderip.

Partula rosea, Broderip, Proc. Zool. Soc., 1832, p. 125. Müller, Syn., p. 32. Reeve, Conch. Syst., ii, Pl. CLXXV, figs. 9, 10; Conch. Icon., Pl. I, figs. 1 *a*, *b*, *c*. Jay, Cat. Shells, p. 57 (1832). Pfeiffer, Mon. Hel., iii, p. 448. Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. (*Matata*) Hartman, Cat. Part., p. 14 (with woodcut); Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 186, 191 (excl. *simplaria*).

Partulus roseus, Beck, Ind. Moll., p. 57.

Bulimus roseus, Pfeiffer, Mon. Hel., ii, p. 70, part.

Partula purpurascens, Pfeiffer, Proc. Zool. Soc., 1856, p. 333; Mon. Hel., iv, p. 511.

Partula cognata, Pease, MS. Coll. Pease, 1863. Schmeltz, Cat. Mus. Godeff., v, p. 92. Gloyne, Quar. Jour. Conch., i, p. 338.

The headquarters of this beautiful and well-known arboreal species is in a large forest at the head of Hawai bay on the west side of Huaheine. From this region, where they are very numerous, they have spread over many parts of the island. They differ but little in shape in the different localities, except in Faahiti on the north coast, where they are smaller, less angulated on the last whorl, and in the total absence of the uniform dark purple-brown and rose-colored varieties which are so common elsewhere. It is the *P. cognata*, Pease. The most numerous variety of the latter form is straw-yellow with the sutural line tinted with rose or purple-rose. A rose or purple-brown variety with a central yellow band is found in no other part of the island.

P. rosea exhibits the following color-variations:

Var. *a*. Uniform yellowish. Very numerous.

Var. *b*. Uniform dark purple-brown. Common. = *P. purpurascens*.

Var. *c*. Uniform rose or rose-red. Common. Type.

Var. *d*. Yellowish, with the base and narrow sutural band purple-brown or rose-color. Common.

Var. *e*. Rose or purple-brown, with the basal half of the body-whorl yellowish. Frequent in the metropolis, but very rare elsewhere.

Var. *f.* Yellowish, with the sutural line tinted with rose or purple-brown. Very common in Faahiti valley, but rare elsewhere. = *P. cognata.*

Var. *g.* Yellowish, with the spire more or less rose or purple-brown. Common.

They vary in a greater or less degree in the proportion of length to diameter, as well as in the thickness of the shell; and some are more distinctly angulated than others.

P. DENTIFERA, Pfeiffer. Plate III, fig. 84.

Partula dentifera, Pfeiffer, Proc. Zool. Soc., 1852, p. 85; Mon. Hel., iii, p. 447. Carpenter, Proc. Zool. Soc., 1864, p. 675 (part). Pease, Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., v, p. 207. (*Astræa*) Hartman, Cat. Part., p. 8, with woodcut; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 181, 183, 194 (excl. *Raiatensis*).

Partula decorticata, Pease, MS. Coll. Pease, 1863.

Partula labiata, Pease, MS. Coll. Pease, 1863. Paetal, Cat Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, pp. 92, 207. Pfeiffer, Mon. Hel., viii, p. 209.

The specific centre of the type of this species is in the large valley of Vairahi, on the east coast of Raiatea, where it occurs in vast numbers on foliage in company with the typical *P Hebe.* It has not spread at all to the southward, but, on the other hand, has migrated into a small adjacent valley, where it is much less abundant, and differs from the type in about half of the specimens having a prominent parietal tooth, which is *always* absent in examples inhabiting Vairahi; otherwise the shells are not dissimilar.

It may be distinguished by its elongate-conical form, straw-yellow color, rather shining surface, chink-like perforation, and small oblong obauriform white aperture. The peristome is ivory-white, heavily calloused, the surface angularly ridged, strongly labiated within and armed with a median prominent acute denticle, above which the lip is strongly contracted, forming a conspicuous sinus. A very rare variety occurs of a ruddy brown color, purple-black apex, and flesh-colored peristome. Examples with a white sutural line are not infrequent; otherwise it is *never* ornamented with bands. The most perfect specimens *always* have the body-whorl more or less decorticated behind the peristome, which suggested the provisional name *decorticata.*

P. ELONGATA, Pease.

Partula elongata, Pease, Amer. Jour. Conch., 1866, p. 196; 1867, p. 81, Pl. I, fig. 2; Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., iv, p. 72. Pfeiffer, Mon. Hel., viii, p. 196.

Partula lineata, Carpenter (not of Lesson), Proc. Zool. Soc., 1864, p. 676.

Partula tæniata, Hartman (not of Mörch), Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 188 (part).

The headquarters of this arboreal species is in Vaianai valley on the southeast coast of Moorea, where it is abundant, associated with *P. lineata* and *P. Mooreana.* It occurs, also, but in less numbers, in a valley to the westward, where it is found in company with *lineata* and *tæniata.* The same valley, which is about two miles from

Vaianai, is the limit of the range of the latter species on that part of the island, and hybrids between it and *elongata* are rather common, the same as between *Garrettii* and *Thalia* at Raiatea. To the eastward of Vaianai it ranges throughout the small valleys for a distance of several miles, as far as Ohaumi, the specific centre of *strigosa*.

I cannot agree with Dr. Hartman in uniting this species with *tæniata*. It is only through hybrids between the two species that the inosculation takes place. Examples taken in any of the valleys *not* inhabited by *tæniata* prove at once its distinction.

The type is elongated, thin, translucent, corneous, straw-yellow or pale fulvous, frequently with narrow longitudinal darker stripes, and the rather ample aperture is edentated. The outer lip is thin, simple, moderately expanded. The columella is flat, not nodulous or gibbous. Examples with two to four narrow, light chestnut-brown, more or less broken, revolving bands are not infrequent. They vary in the length of the spire, as the following measurements will show:—

Length 17, diam. 7½ mill.
Length 15, diam. 8 mill.

P. Thalia, Garrett. Plate III, fig. 46.

Partula abbreviata, Pease, MS. (not of Mousson) Coll. Pease, 1863.
Partula auriculata, var., Carpenter, Proc. Zool. Soc., 1864, p. 675.
Partula Peaseana, Garrett, MS. (not Peasei, Cox).
Partula Thalia, Garrett, MS. (*Nenia*) Hartman, Cat. Part., p. 7; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 188, 191, 192.

Shell compressly perforated, solid, ovate-conic, somewhat shining, lines of growth rather smooth, and revolving incised lines very fine and crowded; whitish or yellowish horn-color, with or without a purple-black apex; spire rather short, conical, with plano-convex outlines, half the length of the shell; suture slightly impressed; whorls five, flatly convex, the last one large, subglobose; aperture subvertical, abbreviately subauriform; parietal region more or less glazed, and armed with a white tubercular tooth; peristome white, moderately expanded, thick, angularly ridged, strongly incrassated within, sinuous above, and the margins frequently joined by a ridge of callus.

Length 17, diam. 11 mill.

Var. *a*. Fulvous brown, with or without purple-black apex. Rather rare.

Var. *b*. With brown base and sutural band. Not common.

The specific centre of this very abundant arboreal species is in Huaru valley, on the west coast of Raiatea. It has spread along the well-wooded lowlands about two miles north and one mile south of its metropolis, slightly overlapping the northern range of *P. Garrettii*.

It is smaller, smoother, more shining, much less variable in color, and the aperture is less auriform than *P. auriculata*.

The columella is frequently slightly gibbous or nodulous in the inner margin.

P. STOLIDA, Pease. Plate III, fig. 58

Partula stolida, Pease, Amer. Jour. Conch., 1866, p. 198; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., viii, p. 195. (*Helena*) Hartman, Cat. Part., p. 10; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 187.

Partula Vanikorensis, Carpenter (not of Quoy and Gaimard), Proc. Zool. Soc., 1864, p. 675.

I took a few examples of this ground species about two miles up Papenoo valley, on the northeast coast of Tahiti. They were all found lurking among the roots of ferns. When Mr. Pease described it, he gave the habitat "Tahitian archipelago," and in his list of Polynesian land shells (Proc. Zool. Soc., 1871), he erroneously cites "Raiatea" as its locality.

Unfortunately I have only three examples before me, so I cannot decide on its variation. All my duplicates, which were acquired by Mr. Pease, were very uniform in shape. It may be described as an elongate-ovate, rather thin, dull brownish or olive-brown shell, 18 to 20 mill. in length by 9 to $10\frac{1}{2}$ in diameter. The spire which comprises half the length of the shell is more swollen than in the elongate dextral *P. Otaheitana*. The parietal region is usually toothed, and the peristome is thinner, not so much reflected, more flattened and oblique. No banded examples occurred.

Dr. Hartman gives the wrong locality. The locality is rightly indicated on his chart.

P. ATTENUATA, Pease.

Partula attenuata, Pease, Proc. Zool. Soc., 1864, p. 672; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 156. Schmeltz, Cat. Mus. Godeff., v, p. 92. Gloyne, Quar. Jour. Conch., i, p. 337. (*Pasithea*) Hartman, Cat. Part., p. 11; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 179.

Partula gracilis, Pease, Amer. Jour. Conch., 1866, p. 197; 1867, p. 81, Pl. I, fig. 3. Binney, Proc. Acad. Nat. Sci. Phil., 1875, pp. 244, 247, Pl. XIX, fig. 6 (part of jaw). Pease, Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104.

Partula amabilis, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675.

Partula Carteretensis, Reeve (not of Quoy and Gaimard), Conch. Icon., sp. 13, Pl. IV, fig. 13. Schmeltz, Cat. Mus. Godeff., iv, p. 72.

This small species, which has an extensive range, occurs in the upper portions of all the central valleys on both the east and west sides of Raiatea. It is more abundant in Toloa and Hapai valleys than elsewhere. Owing to its peculiar habit of living on the foliage near the tops of trees, it easily escapes observation. It occurs more rarely at Tahiti, where it has, also, a wide range, and, like the Raiatea shells, is confined to the upper portions of the valleys.

When we take into consideration its peculiar habit of concealment in the tops of trees, and its range restricted to the more elevated portions of the valleys, so contrary to the habits of other species, it is really remarkable to find it inhabiting two remote islands, especially as all the other species have a very limited range. It does not occur at Tahaa, which is only four miles from Raiatea, and enclosed in the same encircling

reef. It is no less singular to note its absence from Huaheine and Moorea, though at the former island we find the closely allied *P. annectens*.

Its most essential characters are its graceful oblong-conic shape, narrow body-whorl, uniform whitish horn-color and broadly expanded white lip.

Reeve has erroneously described and figured this species under the name of *P. "Carteretensis,"* Quoy and Gaimard. The latter author's *P. Carteriensis* (*H. lix*) is of an entirely different type.

P. FUSCA, Pease. Plate III, fig. 50.

Partula fusca, Pease, Amer. Jour. Conch., 1866, p. 193; Proc. Zool. Soc., 1871, p. 473 Paetel, Cat. Conch., p. 104. Binney, Proc. Acad. Nat. Sci. Phil., 1875, pp. 245, 247, Plate XIX, fig. 9 (anatomy). Pfeiffer, Mon. Hel., viii, p. 205. Schmeltz, Cat. Mus. Godeff., vi, p. 81. Hartman, Cat. Part., p. 6; Obs. Gen. Part., Bul. Mus. Com. Zool., ix. p. 182 (excl. *ovalis* and *lugubris*).

Partula protea, Pease, MS. Coll. Pease, 1863. Schmeltz, Cat. Mus. Godeff., v, p. 92. Pfeiffer, Mon. Hel., viii, p. 209.

Partula faba, var., Carpenter, Proc. Zool. Soc., 1864, p. 675 (= *protea*).

Partula navigatoria, Carpenter, l. c., not of Pfeiffer.

The metropolis of this very variable ground species is in Vaioara valley, on the west coast of Raiatea, the headquarters of *P. Garrettii* and *navigatoria*. It has not migrated any to the southward, but to the northward it occurs sparingly far up in Huaru valley. On the opposite side of the island it is found in Tepua valley, and I took a few in a small ravine more to the southward. The Tepua shell, which is the *protea*, Pse., differs none from his *fusca*.

Hybrids between *protea* and the arboreal *P. faba* are not uncommon, and are usually found adhering to the lower parts of the trunks of trees.

In Vaioara, hybrids between *fusca* and *navigatoria*, and between the two former and *faba*, are so frequent as to be very embarrassing in the separation of the three species collected in that valley. Like the Tepua hybrids, all those between the two ground species and the arboreal *faba* live on the lower parts of the trunks of trees.

P. fusca may be described as follows:—

Shell umbilicated, solid, varying from an abbreviate-ovate to oblong-ovate, roughly striated by irregular lines of growth, and the usual fine spiral incised lines become evanescent on the body-whorl; spire convexly conical, less than half the length of the shell; suture linearly impressed, frequently margined by a thread-like white line; whorls 5–6, more or less flatly convex, last one large, convex, rounded or turgid, sometimes slightly angled just above the aperture; base more openly umbilicated than usual in the ground species; aperture subvertical, oblong, sides nearly parallel; parietal region more or less glazed with callus, and sometimes dentate; peristome rather broadly expanded, moderately thick, slanting, flat or concave, strongly incrassated within and sinuous above; columellar lip depressed, receding or transversely grooved above. Color very variable: whitish corneous, straw-yellow, fulvous, light or dark chestnut,

sometimes brown-black, and frequently strigated. Yellowish horn-colored examples with the base and the sutural band chestnut, are not uncommon. The lip, though usually white, is frequently margined with purple-brown.

Length 20, diam. 11 mill.

The above is about the average dimensions. My largest example is 24 by 13½ and the smallest adult 17 by 10 mill. Sometimes, though rarely, the spire equals half the length of the shell. Very old examples have a more or less nodulous columella and a more or less distinct denticle on the outer lip.

P. TÆNIATA, Mörch.

Bulimus (*Partulus*) *tæniatus*, Mörch, Cat. Conch. Kjerulf., p. 29.
Bulimus Otaheitanus, var., Pfeiffer, Mon. Hel., ii, p. 72, part.
Partula tæniata, Pfeiffer, Mon. Hel., iii, p. 451. Carpenter, Proc. Zool. Soc., 1864, p. 675. Hartman, Obs. Gen. Part. Bul., Mus. Com. Zool., ix, p. 188 (part).
Partula striolata, Pease, Amer. Jour. Conch., 1866, p. 197; 1867, p. 81, Pl. I, fig. 4; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., viii, p. 203.
Partula simulans, Pease, Amer. Jour. Conch., 1866, p. 202; 1867, p. 81, Pl. I, fig. 11. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., v, p. 92. Pfeiffer, Mon. Hel., viii, p. 206.
Partula nucleola, Pease, MS. Coll. Pease, 1863.
Partula decussatula, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675.
Partula spadicea, Hartman (Reeve?), Cat. Part., p. 11.

The metropolis of this truly protean species is in a very large semicircular valley on the north coast of Moorea, where it occurs in prodigious numbers on the foliage of bushes. In the western part of the same valley, where it exhibits less variation, it gradually intergrades with the form which has been distributed under the name of *nucleola*, Pease, which has its headquarters in a small, but isolated, valley about two miles west of Opunohu.

Pease's *nucleola*, which is quite abundant, is usually smaller, more solid, spire shorter, aperture smaller and more rounded, and the columella is more distorted, than in the typical *tæniata*. But in looking over a large number of specimens we notice some examples which cannot be separated from some of the smaller forms of the latter species.

On the southwest part of the island we find *tæniata* tolerably abundant in three valleys, and, like the shells in the western part of Opunohu, it is subject to much less variation than obtains in the eastern part of the same valley. The shells from the southwest coast were described by Pease under the name of *P. simulans*.

In the third or more eastern valley, where they come in contact with *P. elongata* and *lineata*, hybrids between the former and *tæniata* are so numerous that any one collecting in that valley only would, without hesitation, pronounce them one and the same species.

From this point to a distance of several miles, the valleys are inhabited by *lineata*,

Mooreana, *elongata* and *lineata*, var. *strigosa*, only. But after passing Oahumi, the home of the latter variety, we again find *tæniata*, but nearly as variable as the eastern Opunohu shells, and mixed with the form known as *striolata*, Pse., with which it intergrades. Here I found several unmistakable hybrids between *strigosa* and *tæniata*. All the valleys between this latter location and the one nearest to Opunohu are inhabited by the typical form *striolata*, which scarcely differs from *nucleola*, except in being smoother and more variegated with stripes. In a large valley adjacent to Opunohu, we find these shells by thousands; they differ in being beautifully striped like *strigosa*. Here, again, it insensibly graduates into the typical *tæniata*. Whether the inosculation takes place through hybrids or not is a difficult question to decide In looking over a large collection from the eastern part of Opunohu, I find some of the small forms are not dissimilar to the typical *striolata*, which has suggested the propriety of following Dr. Hartman in consolidating the three forms.

The typical *tæniata* varies from abbreviate-ovate to elongate-ovate, more or less solid, scarcely shining, smooth or wrinkled with incremental striæ, and the spiral incised lines are very fine, and crowded on all the whorls. The spire is more or less produced half the length of the shell, sometimes shorter or a trifle longer. Whorls moderately convex, the last one convex or convexly rounded, frequently compressed in the back and right side, which gives it a faint biangular appearance. The subvertical aperture, which is variable in size and shape, varies from subovate to oblong. The peristome is more or less expanded, sometimes considerably so, moderately thick, slanting and labiated within. Columellar lip more or less tortuous, abruptly receding above, which gives it a nodulous appearance. About one in a hundred exhibits the parietal tooth. The following measurements will illustrate the variability in shape:—

Length 17, diam. 9, aperture (including lip) $9\frac{1}{3}$ mill.
Length 17, diam. 8, aperture (including lip) 8 mill.
Length 13, diam. 7, aperture (including lip) 8 mill.

The color is also variable: white, straw-yellow, lemon-yellow, light orange, corneous, fulvous, various shades of brown, sometimes with darker strigations, and frequently spirally banded. The most common style of fasciation consists of from one to four narrow, more or less broken, fulvous or fulvous-brown bands on the body-whorl. Fulvous-brown examples, with two or three pale bands, are not so common. The last appears to be Mörch's type, which he incorrectly assigns to the Viti Islands.

Pease's *striolata* and *nucleola* exhibit the same coloration as the typical *tæniata*, but are sometimes of a deeper brown, and the former is more conspicuously strigated.

Dr. Hartman, on the authority of Pfeiffer, quotes *P. peraffinis*, Pse., which he adds to the synonymy of *tæniata*. I do not know any such species, and cannot find any reference to it in Pfeiffer's Monographs. He also regards Reeve's *spadicea* as identical with *tæniata*. Both Reeve and Pfeiffer quote the Marquesas Islands as the habitat of that species, but Pease and Dr. Cox mention having received it from the Solomon

Islands. Judging from the description and figure of *spadicea*, I am inclined to consider it distinct and an inhabitant of the latter group of islands.

P. RADIATA, Pease, MS. Plate III, fig. 45.

Partula radiata, Pease, MS. Coll. Pease, 1863. Hartman, Cat. Part., p. 7; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 185 (part).

Partula compressa, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675. Pease, Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., v, p. 207.

Partula microstoma, Pease, MS. Coll. Pease, 1863.

Partula vittata, Hartman (not of Pease), Cat. Part., p. 7 (part).

Shell rimately perforated, moderately thick, not shining, surface roughened by unusually coarse, rude incremental striæ, and the spire marked by more or less distinct crowded spiral incised lines; color whitish or pale luteous horn-color, with longitudinal, irregular, narrow darker stripes; spire conical, with planulate outlines, half the length of the shell; apex subacute, concolored, white, or light brown; suture linearly impressed, sometimes whitish; whorls 5–5½, flatly convex, last one large, convex, sometimes obsoletely angulated in front and generally a little compressed behind the outer lip; aperture subvertical, oblong, obauriform, sides parallel; parietal region more or less glazed, and, with few exceptions, furnished with a white tubercular tooth; peristome whitish, frequently margined with pale purplish brown, rather thin, considerably expanded, concave, very obliquely slanting, strongly and acutely labiated on the inner margin, which is more or less distinctly toothed and sinuous above; columellar lip subnodose.

Length 21, major diam. 10 mill.

Var. *a*. Uniform chestnut-brown. Frequent.

Var. *b*. With a chestnut-brown base and sutural band. Not uncommon.

Var. *c*. With a median brown or chestnut-brown band. Somewhat rare.

The metropolis of this species is in Hamoa valley, on the east coast of Raiatea, the home of *callifera* and *compacta*. It is quite common beneath decaying vegetation and among piles of loose stones. It has not spread any to the northward, but occurs in limited numbers in all the valleys south as far as Vairahi, the headquarters of *P. dentifera*.

P. microstoma, which inhabits the latter valley, though very frequently found adhering to the lower portion of the trunks of trees and shrubs, can scarcely be separated from *radiata*, which is strictly terrestrial in habit. Dr. Hartman unites it with *P. vittata*. It appears to me more nearly related to *radiata* than the latter, which is smoother, and the columellar lip is flat and simple.

The Hamoa shell, which has been widely distributed under the name of *compressa*, is considered by Dr. Hartman to be entirely distinct from the latter, and I follow him in restoring Pease's original name. Hybrids between these shells and *P. faba* are not infrequent.

P. VITTATA, Pease. Plate III, fig. 56.

Partula vittata, Pease, Amer. Jour. Conch., 1866, p. 194; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., viii, p. 200. Hartman, Cat. Part., p. 7; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 169 (excl. *microstoma*).

Partula terrestris, Pease, MS. Coll. Pease, 1863. Paetel, Cat. Conch., p. 104. Gloyne, Quar. Jour. Conch., i, p. 388.

Partula castanea, Pease, Coll. Pease, 1863.

Partula faba, var., Carpenter, Proc. Zool. Soc., 1864, p. 675.

Partula approximata, Pease, MS. Coll. Pease. Schmeltz, Cat. Mus. Godeff., v, p. 207. Gloyne, Quar. Jour. Conch., i, p. 338. Hartman, Cat. Part., p. 7; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 179, 195.

The shape of the typical *vittata* is oblong-conic, more or less compressly umbilicated, and the spire, which equals half the length of the shell, has subplanulate outlines. The ample, oblong aperture is considerably contracted by the intrusion of callus on the inner margin of the peristome, and the sides are nearly parallel. The peristome is rather thin, widely expanded and usually stained with brownish purple. The superior inner margin of the lip exhibits a shallow sinus. The columella is flattened, *not* nodose, and reflected over the umbilicus. The color is whitish, yellowish corneous, fulvous or horn-color, frequently with the basal third of the body and sutural band chestnut-color. Sometimes the apex is black or purple-black. The parietal tooth, though small, is constant. My largest examples are 25 mill. long, and 11 in diameter.

The type is restricted to the higher portions of Toloa valley, on the west coast of Raiatea, where it is not uncommon beneath decaying vegetation. It has not spread any to the northward, but, on the other hand, occurs in greater or less profusion, in a modified form (= *approximata*), in several small valleys on the southwest part of the island. No examples were discovered in Hapai or Vaiau, the headquarters of *lugubris* and *ovalis*, which two valleys are between Toloa and the small ones inhabited by *approximata*.

The latter, which may be regarded as a variety of *vittata*, is characterized by its inferior size, smaller umbilicus, which is frequently impervious, smaller aperture, and less expanded lip. The parietal tooth is very seldom developed. The fasciation is similar in the two forms, but occurs rarely in *approximata*. The latter differs, also, in being generally a lighter or darker chestnut-color, though both have similar horn-colored varieties.

In the valleys on the southern part of the island, we find a gradual change from the typical *P. approximata* into the form known as *P. terrestris*, Pease, which latter connects the former with *vittata*. It is of equal size, and exhibits a similar perforation, large aperture and widely expanded lip. The parietal tooth is seldom absent, and in coloration we find the same style of fasciation, but, like in *approximata*, it is less frequent than in *vittata*. It differs from *approximata* in being generally light horn-color, with darker strigations.

The range of *terrestris* terminates at Opoa valley, on the southeast coast. At Faaloa, on the east coast, there exists a form which is the *P. castanea*, Pease, and is intermediate between *terrestris* and *vittata*. It is usually chestnut-colored, constantly toothed on the parietal wall, and the fasciation is the same as in the other varieties. It has not spread any to the northward of Faaloa, but occurs more sparingly in a small valley between Faaloa and Opoa.

P. NAVIGATORIA, Pfeiffer.

Bulimus navigatorius (*Partula*), Pfeiffer, Proc. Zool. Soc., 1849, p. 131.

Partula navigatoria, Reeve, Conch. Icon., Pl. IV, fig. 21. Pfeiffer, Mon. Hel., iii, p. 449. Carpenter, Proc. Zool. Soc., 1864, p. 675. Hartman, Cat. Part., p. 7; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 184.

Partula variabilis, Pease, Amer. Jour. Conch., 1866, p. 203; 1867, p. 81, Pl. I, figs. 12–14; Proc. Zool. Soc., 1871, p. 473. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff., p. 207. Pfeiffer, Mon. Hel., viii, p. 201.

This species has its headquarters in the lower portion of Vaioara valley, on the west coast of Raiatea, where it is very abundant, associated with *P. fusca*. Though usually found lurking beneath decaying vegetation, it is sometimes taken on the trunks of trees. It does not occur in the next valley to the northward, the home of *P. Thalia*, but has spread along the lowland forests south as far as Upara valley. Hybrids between this species and *fusca* and *faba* are very frequent.

Mr. Pease states, in a letter received from him in 1870, that he had determined *navigatoria* to be a small variety of *P. faba*, and in the following year he published his list of Polynesian land shells, and excluded Pfeiffer's species from the *Partula*.

According to the latter author's description, and Reeve's figure, it is undoubtedly the same as Pease's *variabilis;* and, though a misnomer, must, according to the law of priority, take precedence over the latter species.

The parietal tooth mentioned by Pfeiffer, but not alluded to by Reeve or Pease, is not constant, but exists in about two-fifths of the adults. The former author's "medio subdentato," likewise not mentioned by the latter two writers, is simply the lower angle of the small labial sinus.

In shape it varies from ovate to oblong-ovate, as the following two measurements will show:—

Length 25, diam. 13 mill.
Length 20, diam. 13 mill.

Mr. Pease's accurate figures represent the normal or usual form, and his figures 12 and 13 the typical color, which is luteous or yellowish horn-color, with longitudinal strigations. Uniform whitish corneous or chestnut-colored varieties occur, but are not common. A more abundant variety is the usual one of a chestnut-brown base and sutural band.

P. RUSTICA, Pease.

Partula rustica, Pease, Amer. Jour. Conch., 1866, p. 199; 1867, p. 81, Pl. I, fig. 5; Proc. Zool. Soc., 1871, p. 473. Schmeltz, Cat. Mus. Godeff., v, p. 207. Pfeiffer, Mon. Hel., viii, p. 205.

Partula auriculata, Carpenter (not of Broderip), Proc. Zool. Soc., 1864, p. 675.

Partula crassilabris, Gloyne (not of Pease), Quar. Jour. Conch., i, p. 338. Hartman, Cat. Part., p. 9; Obs. Gen. Part., Bull. Mus. Com. Zool., ix, p. 187 (part).

Partula pinguis, Garrett, MS.

The metropolis of this species is in a large valley called Toloa, on the west coast of Raiatea, where it occurs in great abundance beneath decaying vegetation. It has migrated to the southward into two small adjacent valleys, but does not extend its range so far as Hapai, the next large valley, and the home of the allied *P. crassilabris*.

It is larger, less globose, the aperture more oblong, than the latter species, with which it has been confounded. Its chief character consists in the columellar region being, as it were, pressed in towards the aperture, nodulous on the inner margin, and subangulated at the base. The parietal tooth is less developed and more frequently absent than in *crassilabris*. The coloration is the same in the two species. Like the majority of the ground species, it varies in a greater or less degree in shape and size. Some forms almost exactly simulate *P. Garrettii*, not only in the outline of the shell, but in the peculiar shape of the aperture as modified by the columella being pressed inwardly. Occasionally examples occur which are so much abbreviated that they resemble *P. crassilabris*, but may readily be separated by the dissimilarity in the columellar region.

My *P. pinguis*, of which I have seen only a dozen examples, was found under decaying leaves in the mountain ravines, at the head of Vaioara valley. It certainly = *rustica*.

P. LUGUBRIS, Pease. Plate III, fig. 47.

Partula lugubris, Pease, Proc. Zool. Soc., 1864, p. 672; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 158. Schmeltz, Cat. Mus. Godeff., v, p. 207.

Partula ovalis, Pease, Amer. Jour. Conch., 1866, p. 194; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., viii, p. 205.

Partula dentifera, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675 (= *ovalis*).

Partula fusca, Hartman (not of Pease), Cat. Part., p. 6; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, p. 182 (part).

The specific centre of this ground species is in Vaiau valley, on the west coast of Raiatea, the northern limits of the range of *P. formosa*. It has not spread any to the southward, but, on the other hand, has migrated to the northward into Hapai valley, the headquarters of *P. crassilabris*, with which it is found associated.

The Hapai shell was first described by Mr. Pease, under the name of *lugubris*, and, although nearly as abundant as the Vaiau form (= *ovalis*, Pse.), is smaller, thinner, more attenuated and more variable in color and fasciation.

However, the difference between the two species is so slight that I think it best to unite the two forms.

In shape they vary from abbreviate-ovate to oblong-ovate, not solid, roughly striated, spire usually half the length of the shell, sometimes shorter, and the base more or less compressly umbilicated. The aperture is rather large, suboval, *edentate*, and the columella is depressed, *not* nodulous. Sometimes the front of the body-whorl is faintly angulated. The outer lip is rather thin, moderately expanded, slanting, concave, more or less stained with purple-brown, sometimes dull whitish or tawny, and the inner margin, which is not very heavily labiated, is in adults slightly sinuous above.

The color varies from light chestnut-brown to dark chestnut, sometimes fulvous. Examples with a more or less broad, median, yellowish corneous band are not infrequent in both the Vaiau and Hapai shells.

The following two varieties occur in the typical *lugubris* only:—

Uniform whitish horn-color, with pure white lip. Rather rare.

Yellowish horn-color, with a median, narrow, reddish chestnut band. Rare.

My largest Vaiau specimens are 20½ mill. long, and 11 mill. in diameter. The smallest adult from Hapai is 16 by 8 mill.

I have found hybrids between *lugubris* and *imperforata*, the latter a strictly arboreal species.

Dr. Hartman, overlooking the fact that *lugubris*, *ovalis*, *protea* and *fusca* inhabit widely separated valleys, has suggested that the three former may be the juvenile and adolescent forms of the adult *fusca*. The habitats of the two former species are about two miles apart, and five miles south of the location of *fusca*. *P. protea*, which = *fusca*, is confined to the opposite side of the island, and is separated from the latter by an almost inaccessible mountain.

I cannot conceive how Carpenter could have referred Pease's *ovalis* to Pfeiffer's *dentifera*, a shell of an entirely different type. He also says, in a foot-note to the former author's diagnosis of *lugubris*: "This species is regarded by Mr. Cuming as probably a variety of *P. pacifica*, Pfr.," which latter is by Dr. Hartman referred to *P. Otaheitana*.

P. VARIA, Broderip.

Partula varia, Broderip, Proc. Zool. Soc., 1832, p. 125. Müller, Syn., p. 33. Reeve, Conch. Syst., ii, Pl. CLXXV, figs. 5, 6; Conch. Icon., Pl. III, figs. 17 *a*, *b*, *c*. Pfeiffer, Mon. Hel., iii, p. 448. Pease, Proc. Zool. Soc., 1871, p. 473, *et* var. *glutinosa*, *pulchra*, *simplex*. Paetel, Cat. Conch., p. 104. Schmeltz, Cat. Mus. Godeff, v, p. 92. (*Matata*) Hartman, Cat. Part., p. 14; Obs. Gen. Part., Bul. Mus. Com. Zool., ix, pp. 189, 191 (excl. *strigata*).

Bulimus varius, Pfeiffer, Symb., i, p. 86; ii, p. 124.

Bulimus roseus, var., Pfeiffer, Mon. Hel., ii, p. 70.

Partula glutinosa, Pfeiffer, Proc. Zool. Soc., 1852, p. 85; Mon. Hel., iii, p. 448. Paetel, Cat. Conch., p. 104.

Partula mucida, Pfeiffer, Proc. Zool. Soc., 1855, p. 98; Mon. Hel., iv, p. 513.

Partula pulchra, Pease, MS. Col. Pease, 1863. Schmeltz, Cat. Mus. Godeff., v, p. 92.

Partula Huahcinensis, Garrett, MS.

Partula bicolor, Garrett, MS.
Partula adusta, Garrett, MS.
Partula lugubris, Gloyne (not of Pease), Quar. Jour. Conch., i, p. 338.
Partula simplaria, Schmeltz (Morelet?), Cat. Mus. Godeff., v, p. 92.
Partula perplexa, Pease, MS. Coll. Pease. (Ex. Hartman.)

The metropolis of the typical *P. varia* is in two valleys on the west coast of Huaheine, where they are very abundant on foliage. It was first discovered by Mr. Cuming, who gave the habitat "Society Islands," and gratuitously added that of the "Navigator Islands," where it is *not* found.

The type is very variable in coloration, and considerably so in size and shape. The smallest form, which = *P. pulchra*, Pse., gradually merges into the type, and is restricted to the largest of the two valleys called Hamene. The type which equals my *Huaheinensis* and *adusta*, is usually corneous, luteous, more frequently fulvous, rarely white, and the most abundant variety is dark chestnut, sometimes nearly black with a pale apex and dark or pale lip. Deep chestnut-colored examples, with a wide or narrow central pale band, are not uncommon, and are well represented by Reeve's fig. 17 *a*. His fig. 17 *b*, with an obscure central fulvous band on a pale ground, is rather common.

In the higher portion of Hamene may be found a large form = *bicolor*, Garr., which is either uniform straw-yellow, or greenish yellow, with or without a dark chestnut spire. It differs from the typical *varia* in being larger, more robust, the whorls more inflated and the aperture wider.

In a valley named Faahiti, on the northern part of the island, we find in the greatest profusion, associated with *P. cognata*, Pse., a form shaped like *bicolor*, but smaller and more variable in color than the typical *varia*. The most common variety is light yellowish, sometimes strigated, the lip, and sometimes the base, stained with burnt-brown or violet-brown. Nearly half of the specimens are uniform fulvous brown, or chestnut-brown approaching black. The variety with central pale band is also very frequent, as well as the one of a uniform whitish or luteous with white lip. The pale variety with chestnut spire is somewhat rare, besides one with a dark spire and two narrow bands on the body-whorl. A lot of these shells sent to the "Museum Godeffroy," were by Prof. Mousson referred to Morelet's *P. simplaria*, and have been freely distributed under that name. Morelet cites "Tahiti" as the habitat of his species. His "apice obtuso rosaceo" and "sutura albo marginata" do not occur in these shells nor any of the varieties of *varia*. Mr. Pease did not identify it with any of the Huaheine shells; but Dr. Hartman, on the contrary, regards it as a variety of *P. rosea*.

Besides the three valleys just alluded to, we find this species generally distributed in greater or less numbers throughout all parts of the island, but subject to much less variation in form and color. Like *bicolor*, and the generality of the Faahiti shells, they

are more robust and the whorls more swollen than the typical *varia*. The most common variety is luteous, or straw-yellow, sometimes pale fulvous with the lip more or less stained with violaceous brown. The variety with a white peristome is not uncommon, and a beautiful variety, with a very dark violaceous black spire and wide band of the same color on the middle of the body-whorl, is much more infrequent, as well as the one with a dark spire, without the band. The dark variety with yellowish band, so common in the type and the Faahiti shells, is rarely found elsewhere. The first mentioned variety, which comprises nearly 75 per cent. of the specimens, is probably Pfeiffer's *P. glutinosa*, which Pease quotes as a variety of *P. varia*. Dr. Hartman, in his Catalogue of Partula, records it as a distinct species, and in Observations on the Genus Partula cites the Navigator and Solomon Islands as its habitats; in the same paper he states, in his remarks on Pease's duplicates, that "*P. glutinosa*, Pfr., in one quart was uniform in size and color," which coincides with the Huaheine shells. Both Pease and Dr. Cox have assured me that they have never received Pfeiffer's *glutinosa* from either the Navigator or Solomon Islands. The shells referred to were collected by me on Huaheine, and, as just mentioned, were by Pease regarded as *P. varia*, var. *glutinosa*. Pfeiffer, who erroneously cites the Solomon Islands as the habitat of the latter, remarks, in his fourth volume, that Reeve's *P. varia*, fig. 17 *b*, is the same as *glutinosa*.

I am unacquainted with Pease's varieties *simplex* and *perplexa*—the latter quoted on the authority of Dr. Hartman, but not recorded by the former author in his list of *Partula*.

I have followed Dr. Hartman in adding Pfeiffer's *mucida* to the synonymy of *varia*, which he says is represented in the British Museum by a dark variety of the latter species. The description and measurements harmonize well, but it appears strange that Pfeiffer should have compared his species to *P. filosa*, which belongs to an entirely different type, instead of to the well-known *varia*.

I cannot agree with Dr. Hartman in his affiliation of Pease's *P. strigata*, a Marquesas ("Marquesas? Rve.," Hartman) species, with *P. varia*, which is an entirely distinct species. Pease's shells were collected by a native missionary residing on Woapo, one of the former group, which is 850 miles distant from Huaheine.

The only species likely to be confounded with *varia* is Pease's *P. assimilis* (= *P. Cookiana*, Mouss.), inhabiting Rarotonga, one of the Cook's Islands, 600 miles from the habitat of the former species. Dr. Hartman records it (Cat. Partula) as a valid species, and very correctly makes *P. Cookiana*, Mouss., a synonym. He also records it (Obs. Gen. Partula, p. 179), and remarks: "This shell may prove to be a local variety of *P. varia*." On page 181, l. c., he doubts *Cookiana* being identical with *assimilis*, and on page 189, l. c., makes both *assimilis* and *Cookiana* pure synonyms of *varia*. Pease, in his description of *assimilis*, remarks: "Comparing large numbers, the above is more abbreviate, whorls more convex, and the aperture narrower." The

lip is also less expanded, the spire more turgid, the apex more obtuse and the coloration is comparatively uniform. At any rate, the two species can be distinguished at a glance, and, considering the remote habitats, may be regarded as distinct but closely allied species.

Genus TORNATELLINA, Beck.

T. PHILIPPII, Pfeiffer.

Tornatellina Philippii, Pfeiffer, Zeitsch. Malak., 1849, p. 93; Mon. Hel., iii, p. 524. Pease, Proc. Zool. Soc., 1871, p. 473. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 22; Jour. Acad. Nat. Sci. Phila., 1881, p. 397.

Pupa Philippii, Küster, Pl. XVIII, figs. 20, 21.

Leptinaria Philippii, H. and A. Adams, Gen. Moll., p. 141.

Achatina Philippii (*Leptinaria*), Pfeiffer, Vers., p. 170.

Cionella Philippii, Martens.

This species, though distributed throughout the group, is not plentiful. They were found adhering to the under side of loose stones, beneath dead wood and decaying leaves. I also obtained examples at the Cook's, Marquesas, and received it from one of the Austral Islands.

It may be readily known by its swollen whorls, turgid body, large, compressed, parietal laminæ, and somewhat tortuous columella.

T. OBLONGA, Pease.

Tornatellina oblonga, Pease, Proc. Zool. Soc., 1864, p. 673; Jour. de Conch., 1871, p. 93; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 264. Schmeltz, Cat. Mus. Godeff., v, p. 89. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 21; Jour. Acad. Nat. Sci. Phila., 1881, p. 398.

Tornatellina bacillaris, Mousson, Jour. de Conch., 1871, p. 16, Pl. III, fig. 5. Pfeiffer, Mon. Hel., viii, p. 316. Schmeltz, Cat. Mus. Godeff., v, pp. 89, 90.

Plentiful, and distributed throughout southern Polynesia. Like the preceding, it is a ground species, though sometimes found on the fronds of ferns, and ranges from near the seashore to 2000 or more feet above sea-level.

Prof. Mousson gives an accurate description of *oblonga*, under the name of *bacillaris*, from specimens collected by Dr. Graffe at the Samoa Islands.

I collected Mr. Pease's type examples at Huaheine. Its slender form and nearly vertical simple columella will easily distinguish it.

T. CONICA, Mousson.

Tornatellina conica, Mousson, Jour. de Conch., 1869, p. 342, Pl. XIV, fig. 8; 1870, p. 128; 1871 (var. *impressa*), p. 16; 1873, p. 106. Pease, Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., viii, p. 316. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 21; Jour. Acad. Nat. Sci. Phila., 1881, p. 399. Schmeltz, Cat. Mus. Godeff., v, p. 89.

Cionella conica, Paetel, Cat. Conch., p. 106.

Tornatella oblonga, Pease (part), Proc. Zool. Soc., 1864, p. 673.

Not uncommon, and ranges from the Paumotu to the Viti Isles, and was collected by Dr. Graffe on the low coral islands of Ellice's group in central Polynesia.

I forwarded Mr. Pease a number of examples of this species intermixed with *oblonga*, and, supposing the two to be identical, he included it in his diagnosis of the latter species. Having collected hundreds of specimens of both species at the different groups, I do not hesitate to consider them quite distinct. As compared to *oblonga*, it is lighter-colored, more robust, spire more rapidly tapering, body-whorl larger and more or less compressed in the middle. The parietal lamina is larger, and the columella more tortuous.

Mousson's var. *impressa* is not uncommon in eastern Polynesia.

T. SIMPLEX, Pease. Plate II, fig. 21.

Tornatellina simplex, Pease, Proc. Zool. Soc., 1864, p. 673; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 266. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 22; Jour. Acad. Nat. Sci. Phila., 1881, p. 398.

Tornatellina Newcombi, var., Schmeltz, Cat. Mus. Godeff., vi, p. 80.

This species is distributed throughout all the groups of islands in southeastern Polynesia; on the ground, in forests.

Mr. Pease's type specimens were collected by me at Tahaa. He either overlooked or inadvertently omitted to mention the small, but constant, parietal lamina in his brief diagnosis. The open umbilicus, small parietal lamina, smooth and simple columella, will distinguish it from any other south Polynesian species.

Though shaped like *T. Newcombi*, which inhabits the Sandwich Islands, it is smaller, the umbilicus larger, the columella simple, *not* biplicate, and the parietal lamina is smaller than in Pfeiffer's species.

T. PERPLEXA, Garrett. Plate II, fig. 23.

Tornatellina perplexa, Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 24; Jour. Acad. Nat. Sci. Phila., 1881, p. 398.

Tornatellina bilamellata, Schmeltz (not of Anton), Cat. Mus. Godeff., v, p. 90.

Not uncommon, and ranges throughout the group. Also common to the Austral and Cook's Islands.

As compared with *nitida*, the nearest allied species, it has a more dilated and bidentate columella. The upper denticle is larger and not so acute as in *nitida*. Some examples have the palatal denticles mounted on longitudinal lines of callus.

T. SERRATA, Pease. Plate II, figs. 22, 22 *a*.

Lamellina serrata, Pease, Proc. Zool. Soc., 1860, p. 439; 1871, p. 473.

Tornatellina serrata, Pfeiffer, Mon. Hel., vi, p. 265.

Lamellina lævis, Pease, Proc. Zool. Soc., 1864, p. 672; 1871, p. 473.

Tornatellina lævis, Pfeiffer, Mon. Hel., vi, p. 216.

Not uncommon, and distributed throughout southeastern Polynesia.

For further remarks, see my two papers on the land shells of Rurutu and Cook's Islands, published by the Academy of Natural Sciences of Philadelphia.

T. NITIDA, Pease. Plate II, fig. 24.

Tornatellina nitida, Pease, Proc. Zool. Soc., 1860, p. 439; Jour. de Conch., 1871, p. 93; Proc. Zool. Soc., 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 264. Garrett, Proc. Acad. Nat Sci. Phil., 1879, p. 22; Jour. Acad. Nat. Sci. Phil., 1881, p. 399.

This species is found abundantly on all the islands in southeastern Polynesia, and ranges northwest as far as the Caroline Islands, where I obtained Mr. Pease's type specimens.

It is a thin transparent species, with a more tapering spire than *oblonga*, with the twisted columella of *conica*, but readily distinguished by the acute plication on the columella.

T. APERTA, Pease. Plate II, fig. 20.

Tornatellina aperta, Pease, Proc. Zool. Soc., 1864, p. 673; 1871, p. 473. Pfeiffer, Mon. Hel., vi, p. 264.

Not uncommon on foliage, and ranges throughout the group. A few examples were taken by me at the Marquesas Islands.

It may be distinguished by its globose-ovate form and the peculiar vertical bidentate crest on the columella.

The animal, which is very active, is subpellucid with dusky tentacles. The foot is oblong, rounded behind, and nearly as long as the shell. The eye-peduncles are stout. Labial tentacles, none. Muzzle large, dilated, and aids in locomotion.

T. PEASEANA, Garrett. Plate II, fig. 19.

Shell imperforate, oblong-ovate, smooth, thin, shining, faintly striated, dark brownish horn-color; spire conical, with nearly planulate outlines and subacute apex; suture faintly impressed; whorls five and a half, convex, moderately increasing, last one large, rounded, not descending in front; aperture large, oblique, truncately ovate, nearly half the length of the shell; peristome thin, straight, regularly curved; parietal region with a prominent, thin, revolving white lamina, which is slightly reflected posteriorly; columella armed with a prominent, nearly vertical, bidentate plait.

Length 5, diam. $2\frac{1}{2}$ mill.

Hab.—Moorea Island.

Very rare on foliage. Closely allied to *aperta*, but much larger, more elongate, darker color and the spire more produced.

Genus VERTIGO, Müller.

V. PEDICULUS, Shuttleworth. Plate III, fig. 42.

Pupa pediculus, Shuttleworth, Bern. Mitth., 1852, p. 296. Pfeiffer, Mon. Hel., iii, p. 557. Schmeltz, Cat. Mus. Godeff., v, p. 89. Mousson (var. *Samoensis*), Jour. de Conch., 1865, p. 117.

Vertigo pediculus, Pfeiffer, Vers., p. 177. (*Alæa*) H. and A. Adams, Gen. Moll., ii, p. 172. Mousson, Jour. de Conch., 1869, p. 341. Pease, Proc. Zool. Soc., 1871, pp. 463, 474. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 19; Jour. Acad. Nat. Sci. Phila., 1881, p. 400.

Pupa Samoensis, "MSS." Schmeltz, Cat. Mus. Godeff., iv, p. 69. (*Sphyradium*) Paetel, Cat. Conch., p. 108.

Pupa nitens, Pease, Proc. Zool. Soc., 1860, p. 439. Pfeiffer, Mon. Hel., vi, p. 335.

Vertigo nitens, Pease, Proc. Zool. Soc., 1871, pp. 463, 474.

Pupa hyalina, "Zelebor" Pfeiffer, Mon. Hel., vi, p. 329.

Vertigo hyalina, Pease, Proc. Zool. Soc., 1871, p. 474.

?*Vertigo nacca*, Gould, Proc. Bost. Soc. Nat. Hist., 1862, p. 280; Otia Conch., p. 237. Pease, Proc. Zool. Soc., 1871, pp. 463, 474.

Pupa nacca, Pfeiffer, Mon. Hel., vi, p. 330.

With the exception of *Stenogyra Tuckeri*, this minute shell has the widest range throughout Polynesia of any species.

Its oblong-ovate form and hyaline texture will easily distinguish it.

For further information in regard to this species, see my paper on the Rurutu Island land shells.

V. TANTILLA, Gould.

Pupa (*Vertigo*) *tantilla*, Gould, Proc. Bost. Soc. Nat. Hist., 1847, p. 197. Pfeiffer, Mon. Hel., iii, p. 457. (*Vertigo*) Mousson, Jour. de Conch., 1870, p. 127. (*Vertigo*) Schmeltz, Cat. Mus. Godeff., iv, p. 69. (*Pupilla*) Paetel, Cat. Conch., p. 108.

Vertigo tantilla, Gould, Expl. Ex. Shells, p. 92, fig. 103. (*Alæa*) H. and A. Adams, Gen. Moll., ii, p. 172. Pease, Proc. Zool. Soc., 1871, pp. 460, 463, 474. Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 400.

Pupa Dunkeri, "Zelebor" Pfeiffer, Mon. Hel., vi, p. 333.

Vertigo Dunkeri, Pease, Proc. Zool. Soc., 1871, p. 474.

Vertigo armata, Pease, Proc. Zool. Soc., 1871, pp. 461, 474.

Pupa armata, Pfeiffer, Mon. Hel., viii, p. 407.

Vertigo dentifera, Pease, Proc. Zool. Soc., 1871, pp. 462, 474.

Pupa dentifera, Pfeiffer, Mon. Hel., viii, p. 408.

I gathered examples of this small shell at Tahiti, Huaheine, Borabora and Maupiti. In all probability it occurs on the other islands, and ranges west to the Viti group, where Dr. Graffe obtained specimens.

It may be distinguished from the preceding species by its dark color and thin, plicate striæ.

For further remarks, see my paper on the Cook's Island shells, published by the Academy of Natural Sciences of Philadelphia.

Genus SUCCINEA, Draparnaud.

Succineæ are tolerably abundant on all the islands, except Borabora and Maupiti, where I failed to find examples. Like the *Partulæ*, they may be divided into ground and arboreal species.

There are twelve species recorded from this group, some of which are undoubtedly synonyms, and one or two are doubtful inhabitants. The specific characters of the various species are so feebly expressed that their correct determination, by the aid of the brief Latin diagnoses alone, is an almost hopeless task.

S. HUMEROSA, Gould.

Succinea humerosa, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 183; Expl. Ex. Shells, p. 18, fig. 19. Pfeiffer, Mon. Hel., ii, p. 520. H. and A. Adams, Gen. Moll., ii, p. 128. Pease, Proc. Zool. Soc., 1864, p. 677; 1871, p. 472.

Succinea Tahitensis, Pease (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 677; 1871, p. 472.

Rather common and widely diffused over Tahiti, where it lives on the ground in forests, and appears to be confined to that island.

It may be distinguished from any other Society Islands species by its broad ovate form, very short mammillated spire, large depressed body-whorl, which usually exhibits a roundly angular shoulder, which suggested the specific name. Dr. Gould gives three whorls, though I can detect two and a half only in my numerous specimens. The color is rufus, pale corneous, yellowish amber and whitish. The revolving sulcations mentioned by the above author are not a constant character, and are common to other Society Islands species.

S. TAHITENSIS, Pfeiffer. Plate II, fig. 2.

Succinea Tahitensis, Pfeiffer, Proc. Zool. Soc., 1846, p. 109; Mon. Hel., ii, p. 522. H. and A. Adams, Gen. Moll., ii, p. 129.

Succinea ovata, "Pease," MS. Carpenter, Proc. Zool. Soc., 1864, p. 675.

Succinea papillata, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 675. Pease, Amer. Jour. Conch., 1867, p. 227; Proc. Zool. Soc., 1871, p. 472. Schmeltz, Cat. Mus. Godeff., v, p. 89.

Abundant on the ground in moist places, and distributed throughout the island of Huaheine.

Dr. Pfeiffer's description agrees much better with this shell than with *humerosa*, and, contrary to the opinion of Mr. Pease, I do not hesitate to consider my determination as correct. The locality "Tahiti" is too frequently used for shells inhabiting other islands in the group to deserve much attention. Mr. Cuming, who collected extensively on Huaheine, could scarcely have failed to discover so common a shell, and may have forgotten the exact locality. It is now well known that a large number of his habitats of species discovered by himself are erroneous. Mr. Pease, who was well acquainted with the locality of his *ovata*, gave the wrong one, "Tahiti," where it does not occur.

It is more nearly related to *humerosa* than to any other species, but may be distinguished by its larger and more produced spire, more contracted body, and light amber-color. Specimens with subangulated body-whorl are not infrequent, and some have obscure transverse sulcations.

It has usually been confounded with *papillata*, a much larger species, measuring 15 mill. in length, and a well-characterized papillary apex. The shell now under consideration is only 12 mill. long, the same as stated in Pfeiffer's description.

S. PAPILLATA, Pfeiffer. Plate II, fig. 1.

Succinea papillata, Pfeiffer, Zeit. Mal., 1850, p. 66; Mon. Hel., iii, p. 14. H. and A. Adams, Gen. Moll., ii, p. 129. Carpenter, Proc. Zool. Soc., 1864, p. 675.

Succinea labiata, Pease, Amer. Jour. Conch., 1867, p. 227. Schmeltz, Cat. Mus. Godeff., v, p. 207. Pfeiffer, Mon. Hel., vii, p. 33.

This fine large species is peculiar to Raiatea, where it inhabits moist grounds in the upper portions of the central valleys, both on the east and west coasts. It is not by any means common.

Dr. Pfeiffer, on the authority of Mr. Cuming, gives the wrong habitat "Tahiti." It was, doubtless, collected by the latter at Raiatea, and, as was too frequently the case, he gave the above erroneous locality.

It is the only species I know, inhabiting this group, which agrees closely in all its specific characters with *papillata* as described by Dr. Pfeiffer. Mr. Pease, on the contrary, considered the preceding species to be the true *papillata*, notwithstanding the latter is stated to be 15 mill. in length, whilst the Huaheine shell is only 12, and invariably shows two and a half whorls. The *papillata* has two whorls only and the spire is conspicuously papillary; and Pfeiffer's "margine dextro superne curvato" accords better with this species than with the Huaheine shell.

The color is reddish amber, rarely whitish or light corneous. Sometimes, though rarely, there is slight indication of a depression on the upper portion of the body-whorl, and more frequently the surface is slightly impressed transversely, a character common to nearly all the species inhabiting the group. They vary in shape, as the following measurements will show:—

Length 18, diam. 12, height 6½, spire 5 mill.
Length 17, diam. 11, height 6, spire 6 mill.
Length 14, diam. 8, height 5, spire 5 mill.

All the above were adult examples.

S. PUDORINA, Gould.

Succinea pudorina, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 186; Expl. Ex. Shells, p. 21, fig. 27. Pfeiffer, Mon. Hel., ii, p. 522. H. and A. Adams, Gen. Moll., p. 129. Pease, Proc. Zool. Soc., 1864, p. 677; 1871, p. 472. Schmeltz, Cat. Mus. Godeff., v, p. 89.

Succinea Gouldiana, Pfeiffer, Zeit. Mal., 1850, p. 66; Mon. Hel., iii, p. 13. H. and A. Adams, Gen. Moll., ii, p. 129. Pease, Proc. Zool. Soc., 1871, p. 472.

Succinea De Gagei, Garrett, Proc. Acad. Nat. Sci. Phil., 1879, p. 26.

This is the most abundant species inhabiting Tahiti and Moorea, being widely diffused over both islands, and found in the trunks of trees and foliage of bushes.

It is, without doubt, Gould's *pudorina*, and agrees well with his description and

measurements. When the above author described his *S. rusticana*, he remarked that it resembled his *pudorina*. Our shells, certainly, do agree so nearly with that species as to fully convince me of the correctness of my determination.

Mr. Pease, in his remarks on the Tahitian Succineæ, published in the "Proceedings of the Zoological Society" for 1864, and his "List of Polynesian land shells" (l. c.) for 1871, considers *pudorina* a doubtful species. I cannot understand how he could have overlooked the specific characters of this shell which harmonize so well with Gould's description. I can only attribute it to his having referred them to Gould's *procera*, a species unknown to me, but said to have been collected on Moorea, which I very much doubt, unless it should prove to be identical with the species under consideration.

Having sent a number of specimens to Godeffroy's Museum, they were, by Prof. Mousson, referred to *pudorina*. Pfeiffer's *Gouldiana* is, without much doubt, the same as Gould's species. I also add to the synonymy my *De Gagei*, inhabiting Rurutu, one of the Austral islands.

It is a variable species as regards size, shape and the length of the spire. It is paler-colored, smoother, and the body is smaller and not so much inflated as the preceding three species. Some examples are transversely malleated or indistinctly grooved very rarely with a slight depression on the shoulder. The more attenuated forms closely resemble Baird's *S. Hawkinsii*, and the abbreviate specimens approach in outline Binney's figure of *S. Totteniana*.

S. COSTULOSA, Pease. Plate II, fig. 4.

Succinea costulosa, Pease, Proc. Zool. Soc., 1864, p. 677; 1871, p. 472. Pfeiffer, Mon. Hel., v, p. 31. Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 401.

This well-marked species only occurred to my notice in Fautana valley on the northwest side of Tahiti. They were found on foliage, about two miles inland, and confined to a small area of several acres, but were not plentiful.

Its small size, abbreviate shape and strongly developed striæ are its most obvious characters.

It occurs, also, at Aitutake, one of the Cook's or Harvey Islands.

S. INFUNDIBULIFORMIS, Gould.

Succinea infundibuliformis, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 186; Expl. Ex. Shells, p. 19, fig. 26. Pfeiffer, Mon. Hel., ii, p. 520.. H. and A. Adams, Gen. Moll., ii, p. 129. Pease, Proc. Zool. Soc., 1864, p. 677.

Truella infundibuliformis, Pease, Proc. Zool. Soc., 1871, pp. 459, 472.

I found a few examples of this well-characterized species on the ground in forests on the southwest coast of Tahiti. Dr. Gould mentions Moorea as one of its habitats; though carefully searched for, I failed to detect it on any part of the island, and doubt its existence there.

Its peculiar shape, which suggested the specific name, will readily distinguish it. The last whorl is more or less malleated or grooved, and frequently there may be seen transverse raised lines running parallel with the suture.

S. PALLIDA, Pfeiffer. Plate II, fig. 5.

Succinea pallida, Pfeiffer, Proc. Zool. Soc., 1846, p. 109; Mon. Hel., ii, p. 521. Pease, Proc. Zool. Soc., 1864, p. 677; 1871, p. 472. Schmeltz, Cat. Mus. Godeff., v, p. 207.

This species is very abundant in moist places in forests, both in Raiatea and Tahaa. A closely allied form occurs high up in the mountain ravines on Moorea. It is never found on foliage.

Though Pfeiffer gives the habitat "Tahiti," there is not much, if any, doubt of its having been collected, by Cuming, at Raiatea. So common a species could scarcely have escaped the notice of that experienced collector.

The measurements, color and texture agree very nearly with Pfeiffer's description. Like the preceding species, which it closely resembles, it varies in the size of adults, longer or shorter spire, more or less strongly convex body-whorl, and in color from pale straw-yellow to whitish or corneous. The last whorl is sometimes slightly flattened beneath the suture, and frequently malleated. The striæ are more developed than in *pudorina*. The Moorea specimens are more or less incrusted with dirt, and are rather darker-colored, the striæ coarser, and the aperture more regularly ovate.

S. SUBGLOBOSA, Garrett. Plate II, fig. 3.

Shell small, ovate-globose, rather thick, subopaque, finely and distinctly striated, yellowish corneous, more or less decorticated; spire very short, subacute; whorls two, rounded, very rapidly increasing, the last one very large, subglobose, subangulate on the shoulder, aperture orbicular-ovate, two-thirds the length of the shell; columella strongly arched.

Length 4, diam. 3 mill.

Hab.—Tahiti.

Common on the trunks of trees. Its diminutive size and subglobose form will distinguish it from *costulosa*, the nearest allied species.

Genus LIMAX, Linnæus.

L. RAROTONGANUS, Heynemann.

Limax Rarotonganus, Heynemann, Nach. Malak. Gesell., 1871, p. 43. Schmeltz, Cat. Mus. Godeff., v, p. 96. Garrett, Jour. Acad. Nat. Sci. Phil., 1881, p. 402.

A few examples taken in the lower portion of Fautana valley, on the northwest coast of Tahiti, and appear to differ none from Rarotonga specimens. Not observed in any other part of the group. A few smaller specimens, collected at the Gambier group, are probably the same species.

Genus MELAMPUS, Montfort.

M. STRIATUS, Pease.

Melampus striatus, Pease, Proc. Zool. Soc., 1861, p. 244; Amer. Jour. Conch., 1868, p. 100, Pl. XII, fig. 14; Proc. Zool. Soc., 1871, p. 477. Schmeltz, Cat. Mus. Godeff., v, p. 88. Pfeiffer, Mon. Pneum., iv (*Auriculacea*), p. 311. Martens and Lang., Don. Bismark., p. 56.

A very abundant estuary species, and, so far as known, confined to the Society Islands. It is closely related to *M. ornatus*, Mouss., inhabiting the Viti Isles, but may be distinguished by its darker color, smoother shell, and having but two plications on the parietal region.

M. LUTEUS, Quoy and Gaimard.

Auricula lutea, Quoy and Gaimard, Voy. Astrol., ii, p. 163, Pl. VI, figs. 25–27. Deshayes, in Lam. Hist., viii, p. 338. Küster, Auric., p. 39, Pl. VI, figs. 1–3. Reeve, Conch. Syst., ii, Pl. CLXXXVII, fig. 11. Mousson, Jav. Moll., p. 47, Pl. V, fig. 6.

Conovulus luteus, Anton, Verz., p. 48.

Melampus luteus, Beck, Ind., p. 106. M. E. Gray, Figs. Moll. Anim., Pl. CCCVI, fig. 5. H. and A. Adams, Proc. Zool. Soc., 1854, p. 10; Gen. Moll., ii, p. 243. Pfeiffer, Syn. Auric., No. 30; Mon. Auric., i, p. 36. Mörch, Cat. Yold., p. 38. Mousson, Jour. de Conch., 1869, p. 346. Martens and Langk., Don. Bism., p. 55. Gassies, Faun. Nouv. Caledonia, p. 62. Pease, Jour. de Conch., 1871, p. 93; Proc. Zool. Soc., 1871, p. 477. Paetel, Cat. Conch., p. 114. Schmeltz, Cat. Mus. Godeff., v, p. 88. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 28; Jour. Acad. Nat. Sci. Phil., 1881, p. 402.

Abundant just above high-water mark, and, excepting the Sandwich Islands and Marquesas, found by me in all parts of Polynesia.

M. CAFFER, Kuster.

Auricula caffer, Kuster, Auric., p. 36, Pl. V, figs 6–8. Krauss, Sudafr. Moll., p. 82.

Melampus ater, H. and A. Adams, Proc. Zool. Soc., 1854, p. 10; Gen. Moll., ii, p. 243. Pease, Proc. Zool. Soc., 1871, p. 477.

Conovulus ater, "Muhlf," Anton, Verz., p. 48.

Melampus caffer, Pfeiffer, Mon. Auric., p. 40. Pease, Jour. de Conch., 1871, p. 93. Paetel, Cat. Conch., p. 114. Schmeltz, Cat. Mus. Godeff., v, p. 88. Morelet, Series Conch., ii, p. 94.

Melampus violus, Garrett (not of Lesson), Proc. Acad. Nat. Sci. Phila., 1879, p. 26.

Since writing my paper on the Rurutu Island land shells, I have made a more thorough study of the various authorities who have referred to this species, and have come to the conclusion that this cannot be Lesson's *Auricula viola*, as I was led to suppose from his short description and locality, "Borabora." So far as I can ascertain, it has not been identified by any author since Lesson published his description.

I sent the late Mr. Pease thousands of specimens of *caffer*, both from the Society and Paumotu Islands, yet he has omitted to enter it in his list of Polynesian land shells, published in the "Proceedings of he Zoological Society." He merely records *M.* "*? ater*, Muhlf. Ponepe," one of the western islands of the Caroline group.

It has only occurred to my notice at the Paumotu and Society Islands, being very abundant at the latter group, where they are found in sheltered places above and near high-water mark, generally associated with *Philippii* and *luteus*.

M. FASCIATUS, Deshayes.

Auricula fasciata, Deshayes, Encycl. Meth., ii, p. 90; in Lam. Hist., viii, p. 337. Küster, Auric., Pl. A, figs. 2, 3. Mousson, Jav. Moll., p. 46, Pl. V, figs. 28, 29.

Conovulus zonatus, Muhlfeldt, MS., Anton, Zeit. Malak., 1847, p. 171.

Auricula monile, Quoy and Gaimard, Voy. Astrol., ii, p. 166, Pl. XIII, figs. 28–33. Potiez and Michaud, Gal. Douai, i, p. 202. Reeve, Conch. Syst., ii, Pl. CLXXXVII, fig. 8.

Melampus fasciatus, Beck, Ind. Moll., p. 107. (*Tralia*) H. and A. Adams, Proc. Zool. Soc., 1854, p. 11. Pfeiffer, Syn. Auric., No. 33; Mon. Aur., p. 38. Mousson, Jour. de Conch., 1869, p. 348; 1870, p. 135. Pease, Proc. Zool. Soc., 1871, p. 477. Martens and Langk., Don. Bism., p. 55. Paetel, Cat. Conch., p. 114. Schmeltz, Cat. Mus. Godeff., v, p. 88. Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 402.

Conovulus fasciatus, Griffith, Cuv. Anim. King., Pl. XXVII, fig. 13. Anton, Verz., p. 48. Guerin, Icon. Moll., p. 17, Pl. VII, fig. 8.

Cassidula? monilis, M. E. Gray, Figs. Moll. Anim., Pl. CCCVI, figs. 10, 11 (Ex. Q. and G.).

Tralia (*Pira*) *fasciata*, H. and A. Adams, Gen. Moll., ii, p. 240.

Melampus cinctus, Pease, MS. Coll. Pease, 1863.

Melampus cylindroides, "Mousson" (MS.). Schmeltz, Cat. Mus. Godeff., iv, p. 69.

This, like the preceding species, lives just above high-water mark, and has the same extensive geographical range.

They vary considerably in the convexity of the body-whorl, length of spire, and the minute longitudinal grooves on the spire are either very conspicuous or obsolete, and are sometimes confined to the apical whorls. The base is very rarely obliquely striated. They are subject to considerable variation in color and fasciation. The type varies from bluish white to luteous, and girded with from four to six narrow chestnut bands on the body-whorl.

The following color-varieties may be mentioned:—

a. Uniform bluish white, corneous, luteous, brownish or orange-brown.
b. Orange-brown with three chestnut bands.
c. Orange-brown with chestnut base and spire.
d. Olive-gray with three bluish white bands.

There are usually three, sometimes four plaits on the parietal wall, one on the columella, and five to seven in the palate.

The Marquesas Islands shells, which are generally known as *M. zonatus* (= *cinctus*, Pse., = *cylindroides*, Mouss.), are more cylindrical in shape, and the grooves on the spire are nearly or quite obsolete. Otherwise they differ none from Society Islands specimens.

M. Philippii, Küster.

Auricula Philippii, Küster, Auric., p. 50, Pl. VII, figs. 23–25.

Melampus Philippii, H. and A. Adams, Proc. Zool. Soc., 1854, p. 10; Gen. Moll., ii, p. 243. Pfeiffer, Mon. Auric., p. 31. Pease, Jour. de Conch., 1871, p. 93; Proc. Zool. Soc., 1871, p. 477. Martens and Langk., Don. Bism., p. 56. Schmeltz, Cat. Mus. Godeff., v, p. 88.

Auricula tæniola, Hombron and Jacquinot, Voy. Pol. Sud, v, p. 37, Pl. IX, figs. 16–19.

Melampus tæniola, Pease, Proc. Zool. Soc., 1871, p. 477. Martens and Langk., Don. Bism., p. 56, Pl. III, fig. 12. Pfeiffer, Mon. Pneum. (*Auriculacea*), iv, p. 310.

Melampus lugubris, Beck, Ind., p. 106. ("*Ulietea*") = Raiatea.

Very abundant just above high-water mark. I also obtained numerous examples at the Marquesas, Paumotu and Gambier Islands.

It is subject to considerable variation in size, color, length of spire and convexity of the body-whorl. The latter, with very few exceptions, exhibits a few anterior obliquely transverse impressed rugose striæ. The posterior whorls of the mucronated spire are also spirally impressly striated; the striæ under the lens frequently punctated. The posterior portion of the body-whorl is subangulated. The anterior portion of the parietal region is biplicate and sometimes there is an additional tubercle above. The palate exhibits four to eight white or bluish white plications on a longitudinal layer of callus.

The color is of various shades of brown, olive-brown, grayish, through various tints of yellowish brown and brown-black, with or without one to three pale bluish white or light fulvous yellow bands. The peristome and columella are, with few exceptions, brownish or fulvous. Length, 12–17 mill.

The animal is dusky gray, with brown-black or black tentacles.

I have added to the synonymy of this species *M. lugubris*, Beck. He gives "Ulietea," the old native name for Raiatea, as its habitat. Pfeiffer refers it with a doubt to *M. castanea*. I am quite confident of the identity of *tæniolata* with *Philippii*. While on a visit to the Gambier Islands = Mangareva, where Hombron and Jacquinot obtained their type specimens, I gathered thousands of *Melampi*, and after a careful study could only refer them to *Philippii*, *luteus* and *mucronatus*. Not one could be referred to either *fasciatus* or *caffer*.

Pfeiffer, in his first monograph of *Auriculacea*, erroneously includes *tæniolata* in the synonymy of *fasciatus*, and in his last monograph makes it a separate but doubtful species, and, on the authority of Mr. Pease, mentions the Kingsmills as one of its localities.

Genus LAIMODONTA, Nuttall.

L. conica, Pease.

Laimodonta conica, Pease, Proc. Zool. Soc., 1862, p. 242; Amer. Jour. Conch., 1868, p. 101, Pl. XII, fig. 15; Proc. Zool. Soc., 1871, pp. 470, 477; Jour. de Conch., 1871, pp. 93, 94. Schmeltz, Cat. Mus. Godeff., v, p. 87. Garrett, Jour. Acad. Nat. Sci. Phil., 1881, p. 403.

Laimodonta Anaaensis, Mousson, Jour. de Conch., 1869, p. 63, Pl. V, fig. 1.

Laimodonta conica, Martens and Langk., Don. Bism., p. 57, Pl. III, fig. 13.
Plecotrema Anaaensis, Paetel, Cat. Conch., p. 114.
Melampus conicus, Pfeiffer, Mon. Pneum., iv (*Auriculacea*), p. 319.
? Melampus Anaaensis, Pfeiffer, l. c., p. 320.

This species, though ranging from the Paumotu to the Viti Islands, is rarely found in the Society group. It is smaller and not so robust as *L. Bronni* of the Sandwich Isles. The spiral impressed lines are more conspicuous, and the aperture exhibits a heavier deposit of callus in the palate.

Genus PLECOTREMA, H. and A. Adams.

P. MORDAX, Dohrn.

Plecotrema mordax, Dohrn, Mal. Blat., 1859, p. 204. Pease, Jour. de Conch., 1871, p. 93. Martens and Langk., Don. Bism., p. 55, Pl. III, fig. 8. Paetel, Cat. Conch., p. 114.

A few dead specimens found on the seashore on the northeast coast of Tahiti. It is not uncommon on the Paumotu Isls.

The examples now before me are more globose than any Polynesian species known to me. The riblets are rounded and rugose. My specimens average from 5 to 6 mill. in length, and are nearly white with a very broad, light fulvous zone.

Genus DIADEMA, Pease.
Amer. Jour. Conch., 1868, p. 158.
Garrettia, O. Semper, Cat. Mus. Godeff., v, p. 100, 1874.

D. BIANGULATA, Pease. Plate II, fig. 29.

Cyclostoma biangulata, Pease, Proc. Zool. Soc., 1864, p. 674.
Diadema biangulata, Pease, Proc. Zool. Soc., 1871, p. 475. Pfeiffer, Mon. Pneum., iv, p. 56. Garrett, Jour. Acad. Nat. Sci. Phila., 1881, p. 404.
Cyclophorus (*Ostodes*) *biangulatus*, Martens and Langk., Don. Bism., p. 58, Pl. III, fig. 16.
Garrettia Scalariformis, Paetel, Cat. Conch., p. 424.
Garrettia biangulata, Schmeltz, Cat. Mus. Godeff., v, p. 100.
? Cyclophorus biangulatus, Pfeiffer, Mon. Pneum., iv, p. 114.
? Cyclomorpha biangulata, Pfeiffer, l. c., p. 234.

A few examples were found under decaying leaves and confined to a small area on the southwest side of Moorea, where I obtained Mr. Pease's type specimens. The metropolis or specific centre of this species is Aitutake, one of the Cook's or Harvey Islands, where it is found in the greatest profusion.

Its conical shape, brown color and tricarinate body-whorl will readily distinguish it.

Genus OMPHALOTROPIS, Pfeiffer.

This genus was established by the above author for the reception of a group of cyclostomoid shells, which are distinguished by the filiform carina which circumscribes the basal perforation, simple or slightly expanded peristome, and in shape varying from globose-turbinate to elongate-conical.

They are distributed over a vast area extending from southeastern Polynesia to Mauritius and Bourbon. They are entirely absent from the Sandwich Islands, where the only operculated land shells are *Helicinæ*. Two species of *Atropis* only are recorded from the Marquesas Islands; but their existence in that group certainly wants confirmation. Both Mr. Pease's collector and myself searched in nearly all parts of the group without discovering a single example. In all probability the Society Islands are the eastern limits of this group of shells. At any rate I utterly failed to detect them at the Gambier and Paumotu Islands.

In the Society Islands the typical form is represented by a group in which the keel gradually becomes evanescent, as in *Huaheinensis* and *scitula*, or entirely absent, as in *terebralis* and *producta*. The three latter were classed by Mr. Pease in his genus *Atropis*. All the above species, together with *Boraborensis* and *oblonga*, usually have the body or penultimate whorl more or less angulated and frequently with a periphery-keel.

The animal of *Huaheinensis* varies from pale cinereous to tawny flesh-color with blackish tentacles, which latter are short, conical, blunt and transversely wrinkled. Eyes very conspicuous, black on enlargements at the hinder base of the tentacles. Head broad, emarginate in front. Muzzle slightly dilated and bilobed in front, and used in aiding locomotion. Foot small, oval, nearly half the length of the shell.

O. HUAHEINENSIS, Pfeiffer.

Hydrocena Huaheinensis, Pfeiffer, Proc. Zool. Soc., 1854, p. 308; Mon. Pneum., ii, p. 163. H. and A. Adams, Gen. Moll., ii, p. 300.

Omphalotropis Huaheinensis, Pfeiffer, Mon. Pneum., iii, p. 177. Mart. and Langk., Don. Bism., p. 58, Pl. III, fig. 17. Pease, Jour. de Conch., 1869, p. 148, Pl. VII, fig. 9. Schmeltz, Cat. Mus. Godeff., v. p. 101. Pease, Proc. Zool. Soc., 1871, p. 476.

Assiminea Huaheinensis, Marten, Ann. Mag. Nat. Hist., 1866, p. 206.

Realia Huaheinensis, Pfeiffer, Mon. Pneum., iv, p. 221. Carpenter, Proc. Zool. Soc., 1871, p. 676.

Hydrocena robusta, "Pease," MS. Carpenter, Proc. Zool. Soc., 1864, p. 676.

Omphalotropis robusta, Crosse, Jour. de Conch., 1869, p. 148 (foot-note), Pl. VII, fig. 3. Schmeltz, Cat. Mus. Godeff., v, p. 208.

Occurs in abundance, and widely diffused over Huaheine. It is also plentiful and of larger size in three or four valleys on the west side of Raiatea. At Moorea, where I obtained a few examples, it is of small size (5 mill.) and has the basal keel nearly or quite obsolete. On the ground in forests.

Pfeiffer's type specimens (9 mill.) were collected at Raiatea, and his var. β (6 mill.) at Huaheine. In one valley on the former island I discovered a large variety which attained a length of 11 mill.

They vary considerably in color: pale luteous, corneous, brown, brownish red, reddish horn-color, rarely with a transverse brown or reddish band on the middle of the body-whorl, which latter is sometimes slightly angulated. The epidermis is very

thin, concolored, and the surface is generally more or less eroded. The basal keel is not so distinct as in the typical species inhabiting the western groups.

O. PRODUCTA, Pease.

Realia producta, Pease, Proc. Zool. Soc., 1864, p. 673. Pfeiffer, Mon. Pneum., iv, p. 217.
Omphalotropis producta, Pease, Jour. de Conch., 1899, p. 151, Pl. VII, fig 8.
Atropis producta, Pease, Proc. Zool. Soc., 1871, pp. 471, 476.
Realia elongata, Pease, Amer. Jour. Conch , 1867, p. 225. Pfeiffer, Mon. Pneum., iv, p. 218.
Omphalotropis elongata, Pease, Jour. de Conch., 1869, p. 152, Pl. VII, fig. 4; 1871, p. 95.
Atropis elongata, Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 101.
Realia scitula, Carpenter (not of Gould), Proc. Zool. Soc., 1864, p. 676.
Hydrocena Raiatensis, Mousson, Jour. de Conch., 1869, p. 67, Pl. V, fig. 5.
Realia Raiatensis, Pfeiffer, Mon. Pneum., iv, p. 215.

This variable species is confined to Raiatea and Tahaa, where it is found on the ground in forests, and is widely diffused over both islands.

Mr. Pease's measurement, $10\frac{1}{2}$ mill., is probably a mistake. I have now before me over 500 examples, the largest of which is 9, and the smallest adult is 6 mill. in length. The first has eight, and the latter seven whorls. I note the following colors: whitish, pale luteous, corneous, different shades of brown, reddish brown, and very rarely with a narrow transverse reddish band on the body-whorl. The aperture varies from pale yellowish white to dark ochraceous, sometimes reddish brown or whitish.

The penultimate whorl is frequently slightly exserted over the body-whorl, which latter is rounded, very rarely subangulated, and the base very narrowly perforated or rimate, but not keeled or angulate. The epidermis, which is very rarely present, is thin and smooth. Sometimes the peristome is considerably expanded and the lip duplicated. There is also considerable variation in the convexity of the whorls. Mr. Pease's *producta*, which he first described, differs none from his *elongata*, except having the whorls more flattened, a character which gradually merges into the latter species. The same variation obtains in *Boraborensis* and *terebralis*.

O. BORABORENSIS, Dohrn. Plate III, fig. 60.

Omphalotropis Boraborensis, Dohrn., Malak. Blat., 1859, p. 203. Pfeiffer, Mon. Pneum., iii, p. 175. Pease, Jour de Conch., 1869, p. 151. Schmeltz, Cat. Mus. Godeff., v, p. 208.
Atropis Boraborensis, Pease, Proc. Zool. Soc., 1871, p. 476.
Realia Boraborensis, Pfeiffer, Mon. Pneum., iv, p. 217.

Plentiful and peculiar to Borabora, where they occur on the ground in the mountain forests. Mr. Schmeltz gives the wrong locality.

The more or less conspicuous, longitudinal, elevated striæ on the middle whorls will readily distinguish it from any other Society Islands species. The general color is pale corneous, sometimes whitish, brownish or brownish rose. The last whorl is more or less distinctly angulated a little below the middle, and frequently with a thread-like keel which winds up the spire. The penultimate whorl is often imbricated or exserted.

Adults are nearly always decorticated. The minute perforation is never carinated, but sometimes exhibits a slight marginal pinch. The vertical aperture is whitish or pale yellowish brown, and the peristome is slightly expanded. The epidermis in young examples is thin, smooth, and the same color as the shell.

O. TEREBRALIS, Gould.

Cyclostoma terebralis, Gould, Proc. Bost. Soc. Nat. Hist., 1847, p. 206; Expl. Ex. Shells, p. 106, fig. 120. Petit, Jour. de Conch., 1850, p. 47.

Omphalotropis terebralis, Pfeiffer, Proc. Zool. Soc., 1852, p. 151. H. and A. Adams, Gen. Mol., ii, p. 300. Pfeiffer, Mon. Pneum., i, p. 307. Pease, Jour. de Conch., 1869, p. 151. Paetel, Cat. Conch., p. 124.

Realia terebralis, Gray, Cat. Phan., p. 219. Pfeiffer, Mon. Pneum., iv, p. 217.

Atropis terebralis, Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 102.

Atropis Gouldii, Garr. MS.

Atropis Dohrniana, Garr. MS.

I found this species plentiful on the ground in a lowland forest on the coast of Moorea, and did not find a single example in any other part of the island. It occurs, also, somewhat rarely in three valleys on the northwest side of Tahiti, and more abundantly in the mountain forests of Borabora. On the two latter islands it is confined to an elevation of about 500 feet above sea-level.

The presence of this species in Borabora is somewhat remarkable, as it does not occur on the three intermediate islands. Examples from the latter island, which I have distributed to my correspondents under the name of *Dohrniana*, differ none from Gould's species, except in having a velvety epidermis.

The Moorea shell, to which I gave the provisional name of *Gouldi*, varies from the type in its more attenuated form, the whorls less "imbricated," and the angle on the last one nearly obsolete. It was found associated with the typical *terebralis*, into which it gradually merges.

The color is corneous, grayish olive, rarely luteous under a thin brown or horn-colored smooth or velvety epidermis. In the type the whorls have, as Gould states, an imbricated appearance, but the character is not constant and is more or less evident in several other species inhabiting the group. The last whorl is more or less distinctly angulated and the axis is rimate or imperforate. In old examples, which are more or less decorticated, the aperture is sometimes ochraceous with a pale lip. The size of adults ranges from $4\frac{1}{2}$ to 7 mill. The peristome is frequently obscurely duplicated.

O. SCITULA, Gould.

Cyclostoma scitulum, Gould, Proc. Bost. Soc. Nat. Hist., 1847, p. 206; Expl. Ex. Shells, p. 108, fig. 123. Petit, Jour. de Conch., 1850, p. 47.

Omphalotropis? scitula, Pfeiffer, Proc. Zool. Soc., 1852, p. 151; 1854, p. 307; Mon. Pneum., i, p. 308. H. and A. Adams, Gen. Moll., ii, p. 300. Pease, Jour de Conch., 1869, p. 155.

Realia scitula, Gray, Cat. Phan., p. 220. Pfeiffer, Mon. Pneum., iv, p. 220.
Hydrocena scitula, Pfeiffer, Mon. Pneum., ii, p. 162.
Atropis scitula, Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 102.

This protean species is very common and widely diffused throughout all the valleys on the northwest part of Tahiti, and is equally as plentiful in the various valleys on Moorea. On the ground in forests.

Though usually cited as Gould's *scitula*, I have serious doubts of the correctness of the identification. His diagnosis is as follows:—

"T. parva, elongato-conica, tenuis, rufo-cornea, striis incrementi tenuibus solum insculpta, arcte umbilicata; spira elevata, anfr. 6–7 rotundatis, supernis subangulatus; sutura profunda; apertura rotundato-ovata, parva, trientum longitudinis adæquans; perist. simplex, pallidum. Long. 1-5, lat. 1-10 poll." (Gould).

In his remarks he says: "Almost exactly like *Amnicola Sayana*, Anth. It is larger and more ventricose than *C. vallatum*, and is distinguished from *C. terebrale* by its less slender form and unexpanded lip."

The above short diagnosis does not agree very closely with the numerous specimens now before me. His dimensions are too small to accord with our shells. Neither do they resemble Binney's figure of *Amnicola Sayana*. The only Tahiti shell that resembles Binney's figure is *Atropis Bythinel æformis*, which is the same size as Gould's species, but the whorls are *not* "supernis subangulatus."

The species under consideration is 6 mill. long and 3 mill. in diameter. The spire is oblong-conical with slightly convex outlines; whorls six, convex, smooth, the penultimate frequently projecting over the suture as in *terebralis*, and sometimes filocarinated at the angle. The last whorl is more or less distinctly angulated, rarely with a thread-like keel; sometimes rounded. The axis is rimate or minutely perforated and the margin slightly compressed, rarely filocarinated, sometimes simple, as in *Atropis*. The nearly vertical aperture is ovately rounded, with a slight posterior angle and about one-third the length of the shell.

O. OBLONGA, Pfeiffer. Plate III, fig. 59.

Hydrocena oblonga, Pfeiffer, Proc. Zool. Soc., 1854, p. 305; Mon. Pneum., ii, p. 159. H. and A. Adams, Gen. Moll., ii, p. 299.
Omphalotropis oblonga, Pease, Jour. de Conch., 1869, p. 154.
Atropis oblonga, Pease, Proc. Zool. Soc., 1871, p. 476.
Realia oblonga, Pfeiffer, Mon. Pneum., iv, p. 213.

Abundant on the ground in forests, on the north side of Moorea.

I think Pfeiffer is wrong in assigning this species to the Marquesas Islands. The Moorea shells coincide so nearly with his description, that I do not in the least hesitate in referring them to his species. I am also inclined to believe it only a form of *scitula*.

My largest examples are 7 mill. long by $3\frac{1}{2}$ in diameter, being a little larger than

scitula. The shape is oblong-conical, rimately perforated, whorls six, moderately convex, margined by a thread-like keel, which latter is very conspicuous on the subangulate body-whorl. The base is more or less compressed on the margin of the perforation. Nearly all my examples are decorticated and have a whitish or yellowish aperture. The general color is pale corneous or pale fulvous.

The peristome is slightly expanded at the base and over the perforation, and the margins united by a deposit of callus.

Color variable: whitish, corneous, fulvous, brownish, ruddy brown, rarely pale luteous. Aperture concolored, sometimes ochraceous. The thin brownish epidermis is rarely present on adults. The striæ of growth are scarcely visible under a strong lens.

Genus ATROPIS, Pease.

The above genus was instituted by Mr. Pease (Proc. Zool. Soc., 1871, p. 463) for the reception of those species of *Omphalotropis* which are devoid of the basal carination. Although he ranked the eliminated group as subgeneric, in the same paper (p. 476) he used the name in a generic sense and records eighteen species. His "*A. affinis*" is, by Von Martens, Paetel, Schmeltz and myself, referred to the genus *Scalinella*. His "*A. ochrostroma*" has, like *Omphalotropis Huaheinensis*, a more or less obsolete keel and should be transferred to that genus. His "*A. insularis*," and probably *A. exigua*, are *Chondrellæ*.

After eliminating all the Society Islands species of the *scitula* and *terebralis* type there remain several species which are nothing more than smooth *Scalinellæ*. These only I retain under the name of *Atropis*, and it may be characterized as follows:—

Shell small, rimate or minutely perforated, ovate-conic or elongate-conical, smooth; whorls rounded, suture profound, body-whorl usually turgid; aperture subcircular; peristome simple, sometimes indistinctly duplex, continuous and briefly adhering to the penultimate whorl.

A. ABBREVIATA, Pease.

Realia abbreviata, Pease, Proc. Zool. Soc., 1864, p. 674. Pfeiffer, Mon. Pneum., iv, p. 212.
Omphalotropis abbreviata, Pease, Jour. de Conch., 1869, p. 155, Pl. VII, fig. 5.
Atropis abbreviata, Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 102.

A somewhat rare species, found on the ground on the northwest side of Tahiti.

It may be distinguished by its oblong-ovate form, rounded whorls and ventricose body. The axis is subperforated or rimate and the apex rounded. Under the brownish or olivaceous epidermis the shell is pale horn-color, rarely light olive or ruddy corneous. The aperture is concolored or pale yellowish brown.

A. Vescoi, Dohrn.

Hydrocena Vescoi, Dohrn, Malak. Blatt., 1859, p. 202. Pfeiffer, Mon. Pneum., iii, p. 172.
Omphalotropis Vescoi, Pease, Jour. de Conch., 1869, p. 153.
Atropis Vescoi, Pease, Proc. Zool. Soc., 1871, p. 476.
Realia Vescoi, Martens and Langk., Don. Bism., p. 58, Pl. III, fig. 20. Pfeiffer, Mon. Pneum., iv, p. 210.

More rare than the preceding species, and only occurred to my notice in one valley on the north side of Tahiti, where they were found on the side of a ravine about 1500 feet above sea-level

Smaller and more solid than *abbreviata*, and more or less decorticated. Usually ruddy corneous with a luteous or ochraceous aperture.

A. viridescens, Pease.

Cyclostoma viridescens, Pease, Proc. Zool. Soc., 1861, p. 243.
? *Realia viridescens*, Pfeiffer, Mon. Pneum., iii, p. 171; iv, p. 209.
Blanfordia viridescens, Carpenter, Proc. Zool. Soc., 1864, p. 676.
Omphalotropis viridescens, Pease, Jour. de Conch., 1869, p. 153, Pl. VII, fig. 7.
Atropis viridescens, Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 101.

Not uncommon, and widely diffused over Huaheine. It also occurs sparingly, of larger size, in a single valley on the southeast part of Raiatea. On the ground in forests, and ranges from 100 to 500 feet above sea-level.

Mr. Pease's type specimens were collected by me at the former location. His description being very short, I redescribe it as follows :—

Shell rimate, elongate-conic, rather thick, smooth, under the lens finely striated, corneous, rarely brownish or olivaceous, aperture whitish or pale luteous; spire elongate-conic, with slightly convex outlines; apex subacute; suture deep; whorls 7–8½, strongly convex or convexly rounded, slowly and somewhat irregularly increasing, last one rounded at the base; aperture vertical, orbicular-ovate, nearly one-fourth the length of the shell; peristome continuous, straight or slightly expanded at the base, rarely duplicated and briefly adhering to the penultimate whorl.

Length 7–8, diam. 2½–2⅔ mill.

They are frequently denuded of the thin, smooth epidermis, and some have a more rapidly tapering spire than others. The Raiatea shells are usually corneous, rarely brownish and never olivaceous

A. Bythinellæformis, Garrett. Plate III, fig. 73.

Shell perforated, oblong, conical, rather thin, scarcely shining, smooth, corneous, or light brownish under a thin epidermis; spire oblong, convexly conical, apex rounded, suture profound; whorls six, strongly convex, last one rounded, one-third the length of the shell; aperture rather small, vertical, nearly round; peristome obsoletely doubled, continuous, slightly adhering to the penultimate whorl and very slightly expanded.

Length 5½, diam. 3 mill.

Hab.—Tahiti and Moorea Islands.

This small species, which is somewhat rare, was taken in a single valley on the north side of Tahiti, at an elevation of about 1500 feet above sea-level. A few examples were found in a small area in a lowland forest on the north coast of Moorea.

It is shaped almost exactly like Binney's figure of *Bythinella Nicklineana*. All the specimens, ten in number, now before me, have the peristome slightly doubled or duplicated. As compared with *abbreviata*, it is smaller, more slender, the aperture smaller, the whorls more rounded and basal perforation larger.

A. OBESA, Garrett. Plate III, fig. 72.

Shell small, perforated, solid, ovate-globose, decorticated, smooth, dull whitish horn-color, with a whitish or yellowish aperture; spire abbreviately conical, with an obtuse apex; suture profound; whorls five, convex, last one large, rounded; aperture vertical, orbicular-ovate, nearly half the length of the shell; peristome continuous, simple, straight, regularly curved, base slightly expanded.

Height 4, diam. 3 mill.

Hab.—Tahiti, rare, in a single valley on the northwest part of the island.

As compared with *Vescoi*, the nearest allied species, it is more abbreviate, the body more turgid and the spire shorter.

Genus SCALINELLA, Pease.

S. TAHITENSIS, Pease.

Cyclostoma Tahitensis, Pease, Proc. Zool. Soc., 1861, p. 243.

Hydrocena? Tahitensis, Pfeiffer, Mon. Pneum., iii, p. 173.

Scalinella Tahitensis, Pease, Jour. de Conch., 1869, p. 58, Pl. VII, fig. 1; Proc. Zool. Soc., 1871, p. 475. Mart. and Lang., Don. Bism., p. 59, Pl. IV, fig. 3. Schmeltz, Cat. Mus. Godeff., v, p. 102.

Realia Tahitensis, Pfeiffer, Mon. Pneum., iv, p. 216.

Not uncommon, and widely diffused over Huaheine, where it occurs on the ground in forests. So far it has not been detected on any other island in the group. It appears strange that Mr. Pease should have named this species *Tahitensis*, when he was well aware that his type specimens were collected by me at Huaheine and *not* "Tahiti." His description being very brief, I add the following:—

Shell rimate, elongate-conical, moderately thick, pale cinereous or whitish horn-color beneath a brownish epidermis, which is rarely present; aperture concolored or various shades of ochraceous with a whitish peristome; spire elongate, convexly conic, apex obtuse; whorls 6–7, rounded, the first two or three smooth, the following ones with small longitudinal compressed ribs, about twenty on the body-whorl, which latter is rounded at the base; aperture slightly oblique, subcircular, nearly one-third the length of the shell; peristome continuous, slightly expanded and usually adhering to the penultimate whorl.

Length 6, diam. $2\frac{1}{2}$ mill.

Generally decorticated and more or less eroded.

S. COSTATA, Pease.

Hydrocena costata, Pease, MS. Coll. Pease, 1863.

Hydrocena Taheitensis, Carpenter (not of Pease), Proc. Zool. Soc., 1864, p. 676.

Realia (Scalinella) costata, Pease, Amer. Jour. Conch., 1867, p. 216.

Scalinella costata, Pease, Jour. de Conch., 1869, p. 158, Pl. VII, fig. 2. Schmeltz, Cat. Mus. Godeff., v, p. 102.

Realia costata, Pfeiffer, Mon. Hel., iv, p. 216.

Very numerous on the ground in the lowland forests of Tahaa, where it is peculiar. It differs from *Taheitensis* in its larger size, more robust form, more turgid body, and the ribs are more numerous.

S. MOUSSONI, O. Semper. Plate III, fig. 71.

Taheitia Moussoni, "O. Semper." Schmeltz, Cat. Mus. Godeff., v, p. 102. Pfeiffer, Mon. Pneum., iv, p. 21 (name only).

Not uncommon, and confined to the small island of Maupiti, where they occur on the ground in forests.

The above name appears without description. I describe it as follows:—

Shell rimate, rather slender, elongate-conical, rather thick, cinereous, beneath a brownish or olivaceous epidermis; aperture rarely yellowish; spire elongate, obtuse, with subplanulate outlines; whorls six and a half, strongly convex, apical ones smooth, the others with crowded, longitudinal ribs, about thirty on the rounded body-whorl; aperture roundly ovate, vertical, nearly a third the length of the shell; peristome continuous, somewhat patulous, adhering to the penultimate whorl.

Length 5, diam. 2 mill.

More slender and smaller than *Taheitensis*, riblets more crowded and more numerous, body smaller and the aperture generally more oval.

Genus HELICINA, Lamarck.

H. MAUGERIÆ, Gray. Plate III, figs. 64, 65, vars.

Helicina Maugeriæ, Gray, Zool. Jour., i, p. 251; Beech. Voy., Pl. XXXVIII, fig. 25. Sowerby, Thes. Conch., Pl. III, fig. 55. (*Emoda*) H. and A. Adams, Gen. Moll., ii, p. 304. Pfeiffer, Mon. Pneum., i, p. 348. Mart. and Lang., Don. Bism., p. 61, Pl. III, fig 22. Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 99.

This large and beautiful species is very plentiful on the trunks of trees and low bushes, and is confined to the upper parts of the valleys on the east and west sides of Raiatea, but is not found on the north and south portions of the island.

The type is white, rarely lemon-yellow, with a dark red dorsal and basal band, and saffron-yellow callus. The following varieties occur:—

a. With two narrow reddish dorsal lines, with or without the basal band.

b. Excepting the basal callus, uniform white.

c. Uniform lemon-yellow

d. White, with reddish spire.

All the above varieties are found associated with the type. Operculum pale amber-color.

Var. RUBICUNDA, Pease. Plate III, fig. 65.

Helicina rubicunda, "Pease," Carpenter, Proc. Zool. Soc., 1864, p. 676.

Helicina Maugeriæ, var. *rubicunda*, Pease, Amer. Jour. Conch., 1867, p. 227; Proc. Zool. Soc., 1871, p. 476.

Helicina rubicunda, Schmeltz, Cat. Mus. Godeff., v, p. 99.

I first discovered this well-marked variety in 1871, at Fatimu, on the southwest coast of Raiatea, where the typical *Maugeriæ* does not occur. I took about 200 examples from beneath dead wood and loose stones. In 1874, during a spell of heavy rains, I visited the same location and found the place converted into a swamp, and gathered nearly a thousand specimens from the trunks of trees, the rains having driven them from their usual shelter. At Viaau, a few miles to the northward of Fatimu, I found a second colony drowned out and crawling up the trunks of trees. Both locations are on the lowlands, near the seashore, where the type with a yellow base does not occur.

It may be distinguished by its red or orange red callus; otherwise the coloration is similar in the two varieties.

Var. ALBINEA, Pease. Plate III, fig. 64.

Helicina bella, "Pease," Carpenter, Proc. Zool. Soc., 1864, p. 676.

Helicina Maugeria, var. *albinea*, Pease, Proc. Zool. Soc., 1871, pp. 466, 476.

This variety is restricted to a single valley on the east side of Tahaa (not "Raiatea," as stated by Pease). It may be characterized by its more depressed form, sharper keel and white basal callus; otherwise the coloration and markings are the same as the typical *Maugeriæ*.

H. FLAVESCENS, Pease.

Helicina Pacifica, Pease, Amer. Jour. Conch., 1865, p. 291; 1866, p. 82, Pl. V, fig. 7.

Helicina flavescens, Pease, Amer. Jour. Conch., 1867, p. 228, Pl. XV, fig. 25; Proc. Zool. Soc., 1871, pp. 467, 476. Schmeltz, Cat. Mus. Godeff., v, p. 99. Pfeiffer, Mon. Pneum., iv, p. 260. Garrett, Jour. Acad. Nat. Sci. Phil., 1881, p. 381.

Helicina pisum, Hombr. and Jacq. (not of Philippi), Voy. Pol. Sud, v, p. 44, Pl. XI, figs. 18–22. Pfeiffer, Mon. Pneum., ii, p. 185.

Helicina straminea, Pease, MS. (not of Morelet), Schmeltz, Cat. Mus. Godeff., v, p. 99.

Helicina Tahitensis, Pease, Proc. Zool. Soc., 1871, pp. 466, 476. Schmeltz, Cat. Mus. Godeff., v, p. 98. Pfeiffer, Mon. Pneum., iv, p. 256.

This, the most abundant species, is not only generally diffused throughout the group, but is also equally as common and widely distributed throughout the Harvey Islands, 500 miles to the southward and westward. It is confined to the lowlands in close proximity to the seashore where it is gregarious beneath stones.

H. ALBOLABRIS, Hombron and Jacquinot.

Helicina albolabris, Homb. and Jacq., Voy. Pol. Sud, v, p. 45, Pl. XI, figs. 23–26. Pfeiffer, Mon. Pneum., ii, p. 186. Pease, Proc. Zool. Soc., 1871, p. 476.

Helicina solida, Pease, Proc. Zool. Soc., 1864, p. 673. Mart. and Lang., Don. Bism., p. 60, Pl. III, fig. 24. Pfeiffer, Mon. Pneum., iv, p. 252.

Helicina solidula, Frauenfeld (not of Gray), Verh. Zool. Bot. Ges. Wien, xix, p. 879.
Helicina crassilabris, Schmeltz (not of Philippi), Cat. Mus. Godeff., v, p. 99.

A common species, peculiar to Tahiti, where they are found on the trunks of trees and bushes, and are widely diffused throughout the island. They exhibit considerable variation in size, color and in the height of the spire. The prevailing tint is whitish or yellowish white, rarely lemon-yellow or uniform reddish of various shades, or the two former colors with reddish spire, and more rarely with a dorsal reddish band. The peristome is thick and white, and the basal callus, which is usually of the latter color, is sometimes pale bluish white or lemon-yellow. Operculum light yellowish horn-color.

Major diam. 5–9 mill.

H. CORRUGATA, Pease. Plate III, fig. 62, 62 *a*, 62 *b*.

Helicina corrugata, Pease, Proc. Zool. Soc., 1864, p. 673. Pfeiffer, Mon. Pneum., iv, p. 252.

Not abundant, and, so far as known, is confined to Raiatea, where it occurs on the ground, and sometimes on the trunks of trees.

It may be distinguished by its more or less depressed spire, thin texture, sharp, slightly expanded lip, which is emarginated above the carinate periphery, and by the slight groove which circumscribes the basal callus. The color is pale reddish brown, corneous or pale straw-yellow, rarely variegated.

Diam. 5 mill.

H. RUSTICA, Pfeiffer.

Helicina pallida, Pfeiffer (not of Gould), Zeits. Malak., 1848, p. 86.
Helicina rustica, Pfeiffer, Chem., ed. 2d, No. 25, p. 26, Pl. IX, figs. 26–29; Mon. Pneum., i, p. 357. Gray, Cat. Phan., p. 258. (*Idesa*) H. and A. Adams, Gen. Moll., ii, p. 304. Pease, Proc. Zool. Soc., 1871, p. 476.
Helicina rugulosa, Pease, Amer. Jour. Conch., 1868, p. 157, Pl. XII, fig. 2; Proc. Zool. Soc., 1871, p. 476. Pfeiffer, Mon. Pneum., iv, p. 258.

This small species, which is not uncommon, is generally diffused throughout the group, and is found on the ground, ranging from the lowlands near the seashore to 500 feet above sea-level.

Mr. Pease's *rugulosa* is without doubt a synonym of *rustica*. The oblique ribs or coarse striæ vary from costulate to striate. The small size, uniform color, which is usually pale corneous, sometimes light reddish brown or luteous, depressed body-whorl and straight simple peristome will distinguish it. Some examples are smaller ($2\frac{1}{4}$ mill.) than the dimensions given by Pfeiffer and Pease, and have a more elevated spire and less depressed body-whorl.

H. MINIATA, Lesson. Plate III, figs. 63, 63 *a*.

Helicina miniata, Lesson, Voy. Coquille, p. 349, Pl. XIII, fig. 9. Pfeiffer, Mon. Pneum., i, p. 349. Gray, Cat. Phan., p. 251. (*Emoda*) H. and A. Adams, Gen. Moll., p. 304. Mart. and Lang., Don. Bism., p. 60, Pl. III, fig. 23. Pease, Proc. Zool. Soc., 1871, p. 476.
Helicina rufescens, "Pease," MS. Carpenter, Proc. Zool. Soc., 1864, p. 676.

Helicina Rolvii, Carpenter (not of Pfeiffer), Proc. Zool. Soc., 1864, p. 676. Schmeltz, Cat. Mus. Godeff., v, p. 207.

Helicina albolabris, Schmeltz (not of Homb. and Jacq.), Cat. Mus. Godeff., v, p. 98.

M. Lesson's description, which Pfeiffer has copied, being very brief, I redescribe it as follows:—

Shell solid, conoid, opaque, smooth, somewhat shining, with crowded, faint striæ; color variable, generally brownish red, gradually fading on the body-whorl into whitish, pale yellowish or corneous; aperture and basal callus white or bluish white; spire convexly conoid; whorls $4\frac{1}{2}$–5, flatly convex; aperture very oblique, small, semi-oval; peristome slightly expanded, thickened, somewhat labiate, emarginate above the periphery; columella short, arcuate; callus semicircular, thickened towards the extremities of the peristome, Operculum yellowish horn-color.

Major diam. 9, less. diam. 7, height 6 mill.

Hab.—Borabora Island.

Lesson's shells were procured in the same location, where it is peculiar. They occur abundantly on the trunks and foliage of trees and bushes in the mountain forests.

It is subject to the following variations:—

a. Uniform white.

b. Uniform yellow, with white callus.

c. Pale lemon-yellow, with a spiral brownish red band.

H. INCONSPICUA, Pfeiffer.

Helicina inconspicua, Pfeiffer, Zeits. Malak., 1848, p. 86; Mon. Pneum., i, p. 357. Chemnitz, ed. 2d, p. 26, Pl. IX, figs. 18–21. Gray, Cat. Phan., p. 258. (*Idesa*) H. and A. Adams, Gen. Moll., ii, p. 304. Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 99.

Helicina exigua, Hombron and Jacquinot, Voy. Pol. Sud, v, p. 46, Pl. XI, figs. 32–35. Pfeiffer, Mon. Pneum., ii, p. 187. Pease, Proc. Zool. Soc., 1871, p. 476.

Helicina minuta, Carpenter (not of Sowerby), Proc. Zool. Soc., 1864, p. 676.

Helicina decolorata, "Mousson," Schmeltz, Cat. Mus. Godeff., v, p. 99.

This, the smallest species inhabiting the group, is not uncommon, and is diffused throughout all the islands, where they occur on the ground in forests, and range from near the seashore to 1000 feet above sea-level. I also obtained examples at the Gambier Islands = Mangareva, which differed none from Society Islands specimens. It is *H. exigua*, H. and J.

The peristome, though usually straight and simple, is occasionally slightly expanded, and they vary slightly in the depression of the body-whorl. The coloration is uniform reddish brown, brownish horn-color, corneous, and more rarely luteous horn-color. The operculum is corneous, with a wide flat external ridge. Specimens collected at Maupiti are frequently marked by fugations, delicate spiral lines similar to *H. flavescens*.

H. MINUTA, Sowerby.

Helicina minuta, Sowerby, Proc. Zool. Soc., 1842, p. 7; Thesaur. Conch., p. 13, Pl. I, figs. 40, 41. Pfeiffer, Mon. Pneum., i, p. 391. Chemnitz, ed. 2d, p. 54, Pl. IV, figs. 24–27. Gray, Cat. Phan., p. 281. (*Pachystoma*) H. and A. Adams, Gen. Moll., ii, p. 285. Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., vi, p. 99. Garrett, Proc. Acad. Nat. Sci. Phil., 1879, p. 29.

Helicina discolor, Muhlfeldt, MS., Anton, Vers., p. 53. (Ex. Pfeiffer.)

Helicina flammeata, Muhlfeldt, MS., l. c. (Ex. Pfeiffer.)

This small species is confined to Tahiti and Moorea, where it lives beneath decaying vegetation.

Sowerby's type specimens were collected by Cuming at Rurutu = "Oheatora," one of the Austral Islands.

Some examples exhibit the delicate pilose fugacious striæ as mentioned in my remarks on *inconspicua* and *flavescens*. The color is reddish brown, straw-yellow, corneous or dull reddish.

Major diam. $4\frac{1}{2}$ mill.

H. DISCOIDEA, Pease. Plate III, figs. 67, 67 *a*, 67 *b*.

Helicina discoidea, Pease, Amer. Jour. Conch., 1867, p. 226; Proc. Zool. Soc., 1871, p. 476. Pfeiffer, Mon. Pneum., iv, p. 286.

Helicina albolabris, Carpenter (not of Homb. and Jacq.), Proc. Zool. Soc., 1864, p. 673.

A somewhat scarce species, found only at Tahaa, where it lives on the ground in the lowland forests.

When Mr. Pease described this species he gave the correct locality; but in his catalogue of Polynesian land shells he gives the wrong habitat, "Tahiti," where it does not occur.

It has the sulcate base of *corrugata*, but is more depressed, and the upper surface of the whorls is more or less corrugated by coarse transverse ribs or undulations. The periphery is carinated, and the color is dull reddish brown, rarely pale yellowish horn-color.

H. SUBRUFA, Pease, MS. Plate III, figs. 68, 68 *a*, 68 *b*.

Helicina subrufa, "Pease," Carpenter, Proc. Zool. Soc., 1864, p. 676.

Helicina minuta, Carpenter (not of Sowerby), l. c.

Helicina turbinella, "Pease," Carpenter (not of Pfeiffer), l. c.

Shell depressly conoid, rather thin, somewhat shining, faintly striated; color variable; reddish brown, horn-color, lemon-yellow, rarely with a dorsal reddish band; spire more or less depressly conoid, subacute; suture linear; whorls 4–$4\frac{1}{2}$, convex or flatly convex, rather rapidly increasing, last one somewhat depressed, not descending in front, rounded or obscurely angulated on the periphery; base flatly convex; aperture very oblique, subtriangular-ovate; peristome slightly expanded, sometimes slightly receding above the periphery, obtusely angulate at its junction with the short receding columella; basal callus thin, concolored.

Major diam. $4\frac{1}{2}$–6, height 3–$3\frac{1}{2}$ mill.

Hab.—Raiatea and Borabora.

On the ground in forests. Raiatea examples are larger and more depressed than Borabora specimens. It is very closely allied to *minuta*, but may be distinguished by its more effuse aperture, more expanded lip and larger size.

H. FABA, Pease, MS. Plate III, figs. 61, 61 *a*, 61 *b*.

Helicina faba, "Pease," Carpenter, Proc. Zool. Soc., 1864, p. 676. Pease, Amer. Jour. Conch., 1867, p. 226. (Name only.)

Helicina albolabris, Carpenter (not of Philippi), l. c.

Shell depressly conoid, rather thin, slightly shining, smooth, faintly striated; reddish brown, corneous, pale straw-yellow, rarely bifasciate; spire depressly conoid or convex, apex subacute; whorls four, subplanulate or slightly convex, rapidly increasing, last one not deflected in front, depressed above, with a more or less prominent compressed keel on the periphery; suture linearly impressed; base convex; aperture very oblique, subovate; peristome slightly expanded, thickened within, slightly emarginate above, a little produced at the carination and angulated at its junction with the short receding columella; callus rather thin, spreading, concolored or whitish. Operculum corneous or amber-color.

Major diam. 6, less. 5, height $3\frac{3}{4}$ mill.

Hab.—Raiatea and Moorea.

The above is the size of my largest Raiatea specimens. They are not very plentiful, and are found adhering to the trunks of trees. The Moorea shells are more rare and more globose in shape as well as smaller than the Raiatea examples. The banded variety occurs at Moorea.

As compared with *albolabris*, it is smaller, thinner, more shining, and the shape of the peristome is quite different in the two species. In size, texture and color it is more nearly related to *corrugata*, but may be distinguished from that species by its more turbinate form and the absence of the basal groove.

H. SIMULANS, Garrett. Plate III, figs. 66, 66 *a*, 66 *b*.

Shell depressed, lenticular, rather thin, faintly striated, pale brownish horn-color, or light straw-yellow; spire depressly conoid; suture linearly impressed; whorls four, very slightly convex, last one depressed, not deflected in front, carinated on the periphery, keel rib-like, obtuse; base convex; aperture very oblique, rather large, semi-elliptical; peristome expanded, thin, very slightly receding above, angulate at the junction with the short receding columella; basal callus thin, concolored.

Major diam. 6, height 3 mill.

Hab.—Tahiti. On bushes.

Shaped like *corrugata*, but wants the basal groove of that species.

H. RAIATENSIS, Garrett. Plate III, figs. 69, 69 *a*, 69 *b*.

Shell depressly conoid, rather thin, slightly shining, conspicuously striate, luteous or whitish horn-color, marbled and spotted with opaque white; spire depressly conoid; suture linearly impressed; whorls four and a half, convex, regularly and rapidly increasing, not deflected in front, last one depressed, rounded on the periphery, flatly convex beneath; aperture oblique, wide, semioval; peristome straight, slightly thickened; columella short and receding; basal callus thin, nearly concolored.

Major diam. 5, height 3 mill.

Hab.—Raiatea.

A few examples were found amongst decaying vegetation, on the west side of Raiatea, but not detected in any other part of the group.

It is closely allied to *rustica* in the form of the shell, and the shape of the peristome is quite similar in the two species. It may, however, be at once distinguished by its larger size, lighter texture, smoother and more shining surface and different color, as well as the more receding columella.

Genus CHONDRELLA, Pease.

C. PARVA, Pease. Plate III, fig. 41.

Cyclostoma parvum, Pease, Proc. Zool. Soc., 1864, p. 674.

Chondrella parva, Pease, Proc. Zool. Soc., 1871, pp. 465, 476. Pfeiffer, Mon. Pneum., iv, p. 294.

Not uncommon, and ranges throughout the group. I also took a few specimens at the Marquesas Islands. They occur amongst dry dead leaves, under stones and dead wood.

About the size and shape of *Assiminea nitida*, with rounded whorls, pale horn-color, sometimes ruddy corneous, and varies in size and length of the spire.

C. INSULARIS, Crosse.

Hydrocena insularis, Crosse, Jour. de Conch., 1865, p. 223, Pl. VI, fig. 7.

Omphalotropis insularis, Pease, Jour. de Conch., 1869, p. 154.

Atropis insularis, Pease, Proc. Zool. Soc., 1871, p. 476.

Realia insularis, Pfeiffer, Mon. Pneum., iv, p. 212.

This species, which I first discovered at the Gambier Islands, where M. Crosse's examples were collected, is also common to Tahiti and Moorea. In size it is intermediate between *parva* and *striata*, but is of a more ruddy color, and, like the former, is smooth.

C. STRIATA, Pease. Plate III, fig. 40.

Chondrella striata, Pease, Proc. Zool. Soc., 1871, p. 477. Pfeiffer, Mon. Pneum., iv, p. 294. Garrett, Proc. Acad. Nat. Sci. Phila., 1879, p. 28; Jour. Acad. Nat. Sci. Phila., 1881, p. 408.

Hydrocena striata, Schmeltz, Cat. Mus. Godeff., v, p. 100.

Hydrocena subinsularis, Mousson, MS.

Much more abundant than the preceding species, and occurs in equal abundance at the Austral and Harvey Islands.

Its smaller size, ruddy color and spiral striæ will readily distinguish it from *C. parva*.

Genus TAHEITIA, H. and A. Adams.
Ann. Nat. Hist., 1863, p. 19.

This genus was established for the reception of those specimens of *Truncatella* characterized by the more or less porrected peristome and the elevated laminæ on the operculum. The shell is always thinner and the costæ more compressed than *Truncatella*. The lip is sharper, more expanded, and they inhabit a different station, being found far inland, and not near high-water mark, as in the latter genus.

Mr. Pease, in his list of Polynesian shells, erroneously refers *T. Vitiensis*, Gld., to *Taheitia*.

T. PORRECTA, Gould.

Truncatella porrecta, Gould, Proc. Bost. Soc. Nat. Hist., 1846, p. 40; Expl. Ex. Shells, p. 8, fig. 127. Pfeiffer, Mon. Pneum., ii, p. 7.

Taheitia porrecta, Pease, Proc. Zool. Soc., 1871, p. 477.

This species only occurred to my notice in one location, about one mile up Papenoo valley, Tahiti.

It is 6 mill. long, pale luteous horn-color, the costæ rather distant, and sixteen or seventeen on the last whorl.

T. PALLIDA, Pease. Plate III, fig. 76.

Taheitia pallida, Pease, Amer. Jour. Conch., 1867, p. 229; Proc. Zool. Soc., 1871, p. 477.

Truncatella porrecta, Schmeltz (not of Gould), Cat. Mus. Godeff., v, p. 104.

Truncatella pallida, Schmeltz, l. c., p. 208. Pfeiffer, Mon. Pneum., iv, p. 20.

Very abundant in the lowland forests, and is generally distributed throughout the group. I have found them half a mile inland associated with Helices and cyclostomoid shells.

It is larger and not so much porrected as the preceding species.

Genus ASSIMINEA, Leach.

A. NITIDA, Pease.

Hydrocena nitida, Pease, Proc. Zool. Soc., 1864, p. 674.

Assiminea nitida, Pease, Jour. de Conch., 1864, p. 165, Pl. VII, fig. 11; Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 103. Garrett, Proc. Acad. Nat. Sci. Phil., 1879, p. 29; Jour. Acad. Nat. Sci. Phil., 1881, p. 408.

? *Realia nitida*, Pfeiffer, Mon. Pneum., iv, p. 212.

Hydrocena parvula, Mousson, Jour. de Conch., 1865, p. 184; 1873, p. 108.

Omphalotropis parvula, Pease, Jour. de Conch., 1869, p. 155; Proc. Zool. Soc., 1871, p. 476. Paetel, Cat. Conch., p. 124.

Assiminea parvula, Pease, Proc. Zool. Soc., 1871, p. 476. Schmeltz, Cat. Mus. Godeff., v, p. 103.

Realia parvula, Pfeiffer, Mon. Pneum., iv, p. 213.

Assiminea lucida, Pease, Jour. de Conch., 1869, p. 166, Pl. VII, fig. 10; Proc. Zool. Soc., 1871, p. 476.

Assiminea ovata, "Pease," Schmeltz, Cat. Mus. Godeff., v, p. 103.

Hydrocena similis, Baird, Cruise of the Curacoa.

Generally distributed throughout southern Polynesia. For further information in regard to this species, see my paper on the Cook's Island shells.

Recapitulation.

The following list will show the distribution of the land shells over the seven islands:—

	Tahiti.	Moorea.	Huaheine.	Ratatea.	Tahaa.	Boraboea.	Maupiti.
Microcystis verticillata, Pse.,		x	x				
Microcystis simillima, Pse.,				x			
Microcystis normalis, Pse.,	x	x	x				
Microcystis Discordiæ, Garr.,	x	x	x	x	x	x	x
Microcystis cultrata, Gld.,	x						
Microcystis angustivoluta, Garr.,		x					
Microcystis scalpta, Garr.,					x		
Trochonanina conula, Pse.,	x	x	x	x	x	x	x
Trochonanina calculosa, Gld.,	x	x	x	x	x	x	x
Trochonanina Taheitensis, Garr.,	x						
Trochonanina subrugosa, Garr.,	x	x					
Zonites Mooreana, Garr.,		x					
Trochomorpha trochiformis, Fer.,				x	x		
Trochomorpha pallens, Pease,	x	x					
Trochomorpha Cressida, Gld.,	x						
Trochomorpha assimilis, Garr.,			x				
Patula modicella, Fer.,	x	x	x	x	x	x	x
Patula acuticosta, Mouss.,				x			
Patula lamellicosta, Garr.,	x						
Pitys Maupiensis, Garr.,							x
Pitys parvidens, Pse.,	x	x	x				
Pitys consobrina, Garr.,			x				
Pitys punctiperforata, Garr.,		x					
Pitys Boraborensis, Garr.,						x	
Libera bursatella, Gld.,	x						
Libera coarctata, Pfr.,		x					
Libera retunsa, Pse.,	x						
Libera Heynemanni, Pfr.,	x						
Libera gregaria, Garr.,		x					
Libera recedens, Garr.,		x					
Endodonta Huaheinensis, Pfr.,			x				
Endodonta ficta, Pse.,					x		
Endodonta fabrefacta, Pse.,				x	x		
Endodonta obolus, Gld.,			x	x			
Endodonta cretacea, Garr.,						x	
Endodonta Taneæ, Garr.,						x	x
Stenogyra Tuckeri, Pfr.,	x	x	x	x	x	x	x
Partula Otaheitana, Brug.,	x						
Partula filosa, Pfr.,	x						
Partula hyalina, Brod.,	x						
Partula clara, Pse.,	x						
Partula producta, Pse.,	x						
Partula nodosa, Pfr.,	x						
Partula stolida, Pse.,	x						
Partula attenuata, Pse.,	x			x			
Partula lineata, Less.,		x					

	Tahiti.	Moorea.	Huaheine.	Raiatea.	Tahaa.	Borabora.	Maupiti.
Partula elongata, Pse.,		x					
Partula tæniata, Mörch,		x					
Partula Mooreana, Hart.,		x					
Partula rosea, Brod.,			x				
Partula varia, Brod.,			x				
Partula arguta, Pse.,			x				
Partula annectens, Pse.,			x				
Partula faba, Mart.,				x	x		
Partula auriculata, Brod.,				x			
Partula turgida, Pse.,				x			
Partula radiata, Pse.,				x			
Partula compacta, Pse.,				x			
Partula callifera, Pfr.,				x			
Partula Thalia, Garr.,				x			
Partula Garrettii, Pse.,				x			
Partula citrina, Pse.,				x			
Partula dentifera, Pfr.,				x			
Partula Hebe, Pfr.,				x			
Partula fusca, Pse.,				x			
Partula navigatoria, Pfr.,				x			
Partula imperforata, Pse.,				x			
Partula rustica, Pse.,				x			
Partula vittata, Pse.,				x			
Partula crassilabris, Pse,				x			
Partula formosa, Pse,				x			
Partula lugubris, Pse.,				x			
Partula planilabrum, Pse.,					x		
Partula bilineata, Pse.,					x		
Partula virginea, Pse.,					x		
Partula umbilicata, Pse.,					x		
Partula lutea, Less.,						x	
Tornatellina Philippii, Pfr.,	x	x	x	x	x	x	x
Tornatellina oblonga, Pse.,	x	x	x	x	x	x	x
Tornatellina simplex, Pse.,	x	x	x	x	x	x	x
Tornatellina conica, Mouss.,	x	x	x	x	x	x	x
Tornatellina perplexa, Garr.,	x	x	x	x	x	x	x
Tornatellina serrata, Pse.,	x	x	x	x	x	x	x
Tornatellina nitida, Pse.,	x	x	x	x	x	x	x
Tornatellina aperta, Pse.,	x	x	x	x	x	x	x
Tornatellina Peaseana, Garr.,		x					
Vertigo pediculus, Shutt.,	x	x	x	x	x	x	x
Vertigo tantilla, Gld.,	x		x			x	x
Succinea humerosa, Gld.,	x						
Succinea costulosa, Pse.,	x						
Succinea subglobosa, Garr.,	x						
Succinea pudorina, Gld.,	x	x					
Succinea infundibuliformis, Gld.,	x						
Succinea Taheitensis, Pfr.,			x				
Succinea pallida, Pfr.,				x	x		
Succinea papillata, Pfr.,				x			
Limax Rarotonganus, Heyn.,	x						
Melampus luteus, Quoy and Gaimard,	x	x	x	x	x	x	x
Melampus Philippii, Kust.,	x	x	x	x	x	x	x
Melampus fasciatus, Desh.,	x	x	x	x	x	x	x

	Tahiti.	Moorea.	Huaheine.	Raiatea.	Tahaa.	Borabora.	Maupiti.
Melampus caffer, Kust.,	x	x	x	x	x	x	x
Melampus striatus, Pse.,	x		x				
Laimodonta conica, Pse.,						x	
Plecotrema mordax, Dohrn,	x						
Diadema biangulata, Pse.,		x					
Omphalotropis scitula, Gld.,	x	x					
Omphalotropis terebralis, Gld.,	x	x				x	
Omphalotropis Huaheinensis, Pfr.,		x	x	x			
Omphalotropis producta, Pse.,				x	x		
Omphalotropis oblonga, Pfr.,		x					
Omphalotropis Boraborensis, Dohrn,						x	
Atropis abbreviata, Pse.,	x						
Atropis Vescoi, Dohrn,	x						
Atropis obesa, Garr.,	x						
Atropis Bythinellæformis, Garr.,	x	x					
Atropis viridescens, Pse,			x	x			
Scalinella Taheitensis, Pse.,			x				
Scalinella costata, Pse.,				x			
Scalinella Moussoni, O. Semp.,							x
Helicina albolabris, H. and J.,	x						
Helicina simulans, Garr.,	x						
Helicina minuta, Sowb.,	x	x					
Helicina flavescens, Pse.,	x	x	x	x	x	x	x
Helicina rustica, Pfr.,	x	x	x	x	x	x	x
Helicina inconspicua, Pfr.,	x	x	x	x	x	x	x
Helicina Maugeriæ, Gray,				x	x		
Helicina corrugata, Pse.,				x			
Helicina discoidea, Pse.,					x		
Helicina subrufa, Pse.,				x		x	
Helicina faba, Pse.,		x		x			
Helicina Raiatensis, Garr.,				x			
Chondrella parva, Pse.,	x	x	x	x	x	x	x
Chondrella striata, Pse.,	x	x	x	x	x	x	x
Chondrella insularis, Crosse,	x	x					
Taheitea pallida, Pse.,	x	x	x	x	x	x	x
Taheitea porrecta, Gld.,	x						
Assiminea nitida, Pse.,	x	x	x	x	x	x	x
	64	51	42	61	38	34	29

Tahiti, 64 species, 22 peculiar.
Moorea, 51 species, 11 peculiar.
Huaheine, 42 species, 10 peculiar.
Raiatea, 61 species, 23 peculiar.
Tahaa, 38 species, 8 peculiar.
Borabora, 34 species, 4 peculiar.
Maupiti, 29 species, 2 peculiar.

Out of the 139 species collected by the writer, 108 are peculiar to the group. They are all embraced in 25 genera, 7 of which are operculated. The excessive preponderance of indigenous species in the archipelago clearly demonstrates its claims to a special land-shell fauna.

With the exception of the species of *Melampus* and *Partula hyalina*, all the land shells which are common to other groups are invariably small species. *Mycrocystis conula* and *M. Discordiæ* are common to the Cook's, and the latter also occurs in the Marquesas Islands. *M. calculosa* is found in the latter group and the Viti Islands. *Stenogyra Tuckeri* and *Vertigo pediculus* are diffused throughout Polynesia. *Vertigo tantilla* inhabits the Cook's, Samoa and Viti Islands. *Tornatellina aperta* occurs in the Marquesas. *T. Philippii* extends its range to the Austral, Cook's and Marquesas. *T. conica*, *oblonga* and *nitida* live on all the south Polynesian groups; and *T. serrata*, together with *oblonga*, also occur in the Kingsmill and Caroline Islands. *T. perplexa* inhabits all the southeastern groups. *Partula hyalina* is common to the Austral and Mangaia, one of the Cook's Islands. *Patula modicella* ranges from the Paumotu to the Ellice's group. *Limax Raratonganus* inhabits the Cook's and probably the Gambier Is. *Chondrella parva* is common to the Marquesas, and *C. insularis* occurs in the Gambier group. *C. striata* is abundant in the Austral and Cook's Islands. *Helicina minuta* is found in the Austral, and *H. flavescens* in the Cook's group. *Assiminea nitida* ranges from the Paumotu to the Viti Islands. *Plecotrema mordax* occurs in the Paumotu, and I think inhabits the Gambier Islands. *Laimodonta conica* ranges from the Paumotu to the Cook's, and occurs on the islands in central Pacific. All the *Melampi*, except *striatus*, have a more or less wide range.

The following species, unknown to the writer, are accredited to the Society Islands:—

Helix oceanica, Le Guillou. "Taiti." Is a *Libera* and probably = *L. Heynemanni*. No mention is made of internal lamella

Helix Jacquinoti, Pfeiffer. "Tahiti" and "Marquesas." In his Mon. Hel., vii, he quotes "Taheita" only. It is a *Libera* with the peculiar sculpture of *L. fratercula*, and probably inhabits the Austral Islands.

Helix depressiformis, Pease. "Tahiti." May be a *Zonites*.

Succinea procera, Gould. "Eimeo" = Moorea. Possibly a large elongate form of the variable *S. pudorina*.

Succinea Bernardii, Recluz. "Oceania" (Recluz); "Tahiti" (Cuming).

Cyclostoma ventricosa, Hombron and Jacquinot. "Taheiti." Pfeiffer quotes the "Marquesas." Should be compared with *Atropis viridescens*.

Hydrocena Scherzeri, Zelebor. "Tahiti." Is, I think, a variety of *Omphalotropis scitula*.

Helicina Kusteriana, Pfeiffer. "Tahiti." I doubt this and the following being Tahitian species.

Helicina bicolor, Pfeiffer. "Tahiti."

Auricula viola, Lesson. "Borabora."

In addition to the species unknown to me, I may mention the following *Partulæ:*

P. compressa, Pfeiffer. "Society Islands." Referred by Carpenter to *P. radiata.* Dr. Hartman records it as a distinct species inhabiting the "Fiji Islands" = Viti Isles.

P. solidula, Reeve. "Society Islands." Referred by Carpenter to *P. virginea*, and by Dr. Hartman to *P. lutea.* This and the following are undoubtedly synonymous with some of the species recorded in this paper.

P. simplaria, Morelet. "Tahiti" Referred by Mousson to *P. varia*, and by Dr. Hartman to *P. rosea.*

P. Erhelii, Morelet. "Morea, Society Islands." Dr. Hartman thinks this will prove to be one of the forms of *P. tæniata.*

P. stenostoma, Pfeiffer. "Habitat. . . . ?" Dr. Hartman refers it to *P. vexillum* = *lineata.*

P. suturalis, Pfeiffer. "Habitat. . . . ?" Referred by Dr. Hartman to *P. strigosa* = *lineata*, var.

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